

# AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING  
ENGINEERING • PRODUCTION • MANAGEMENT

SEPTEMBER 1, 1956

MACHINE TOOL AND PRODUCTION EQUIPMENT ISSUE

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A CHILTON PUBLICATION



## **Maytag switches to STANICOOl HD Soluble Oil— makes two-way saving**

### **1 Cost of soluble oil reduced**

### **2 Soluble oil consumption cut two-thirds**

A 300 ton Verson press at the Maytag plant, Newton, Iowa, is used for piercing holes in the inner tubs of Maytag's fine automatic washers. Material used is 18 gauge enameling iron. Holes are pierced in six automatic cycles. A total of 936-3/16 inch holes and 6-19/32 inch holes are incised in each tub.

A check of manufacturing costs on the tubs disclosed that the cost of soluble oil per unit produced was too high. Standard Oil lubrication specialist J. I. Nelson, working with plant management suggested a switch to STANICOOl HD Soluble Oil. The switch was made and Maytag received the first part of its two-way saving: the cost of soluble oil per gallon was reduced. Then it was found that the same high quality product could be turned out, without loss of tool life, while spraying only every third tub. Formerly each tub was sprayed with soluble oil before punching. With STANICOOl HD, soluble oil consumption was reduced two thirds. And thus, Maytag received part two of its two-way saving.

Perhaps STANICOOl HD Soluble Oil can help you make similar savings. Find out. Call your nearby Standard Oil office in any of the Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Dwight Norton (right) a Maytag plant foreman inspects automatic washer inner tub with Jesse I. Nelson, Standard Oil lubrication specialist. Jesse Nelson is well qualified to provide lubrication technical service. He has a B.S. degree in engineering from the University of Iowa and has completed the Standard Oil Sales Engineering School. Jesse has been helping customers with lubrication problems for more than three years. Customers find his experience and training pay off for them.



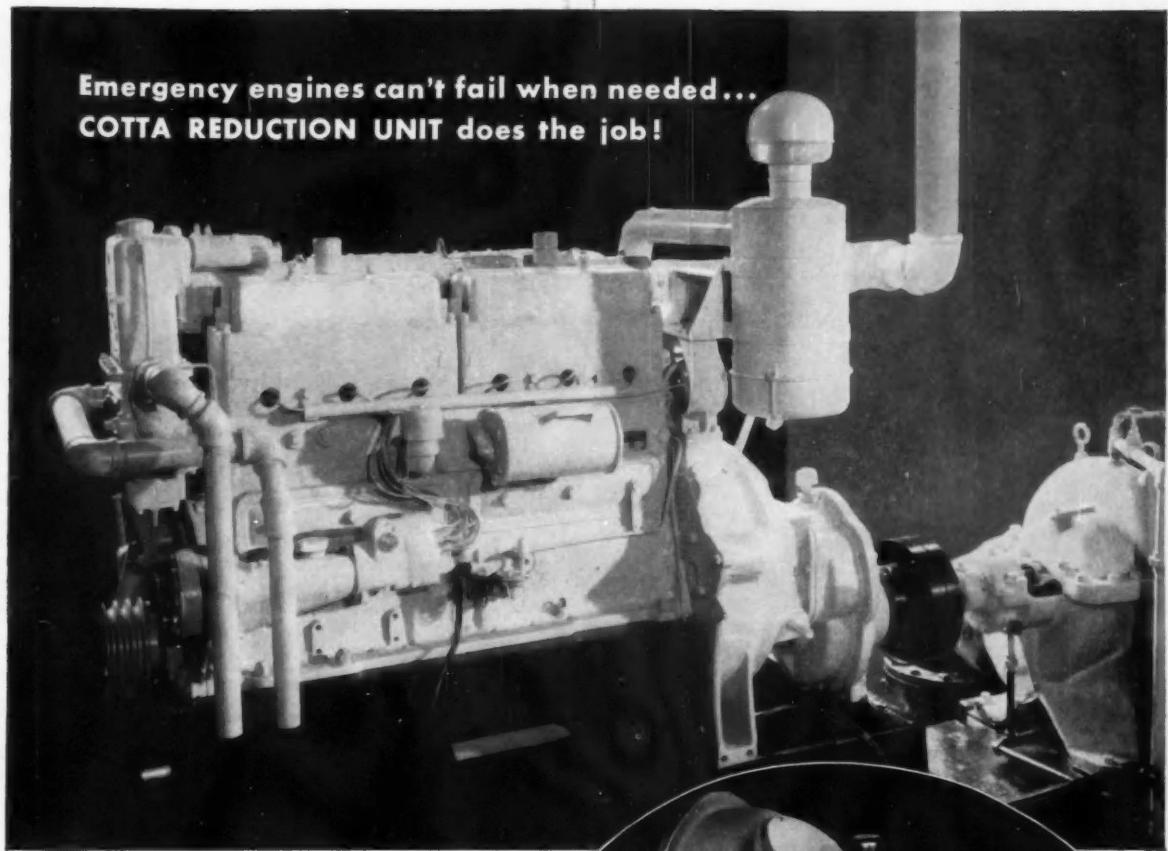
**STANDARD OIL COMPANY**  
(Indiana)

### **Quick facts about**

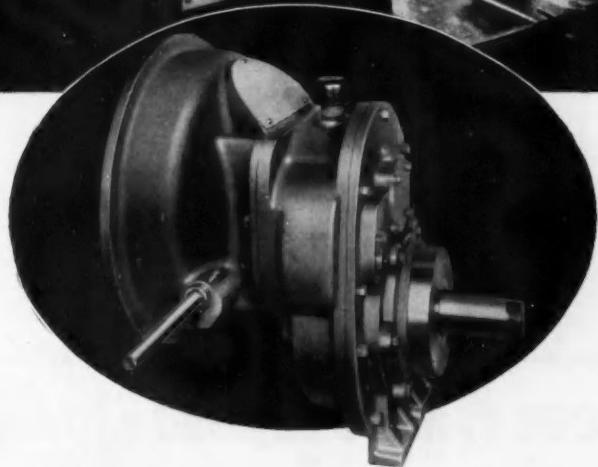
### **STANICOOl HD Soluble Oil**

- Emulsifies readily with all waters.
- Forms stable, uniform emulsion.
- Does not turn rancid.
- Non-injurious to men, machines and work.
- Economical. Meets work requirements with relatively low emulsion concentrations.
- Prevents rusting of work and machines.
- Gives better tool life.
- Doesn't form gum on machines.

**Emergency engines can't fail when needed...  
COTTA REDUCTION UNIT does the job!**



Here is a standby engine-driven centrifugal water pump installation in River Forest, Ill., using a Cotta Heavy-Duty Reduction Unit with 1.43 to 1 ratio. When this engine swings into service to replace three electric pumps, it pumps all the water for the city of River Forest. It must keep pumping for as long as the emergency lasts. Wherever high engine speeds must be converted to slower drive shaft speeds, Cotta Heavy-Duty Reduction Units are the reliable solution to the problem, for intermittent or continuous duty.



If you build cranes, locomotives, drillers, shovels, or similar heavy-duty equipment that requires a standard or "engineered-to-order" reduction unit, Cotta can supply it in the input torque range from 150 or 2000 ft. lb.

THIS INFORMATION WILL HELP YOU

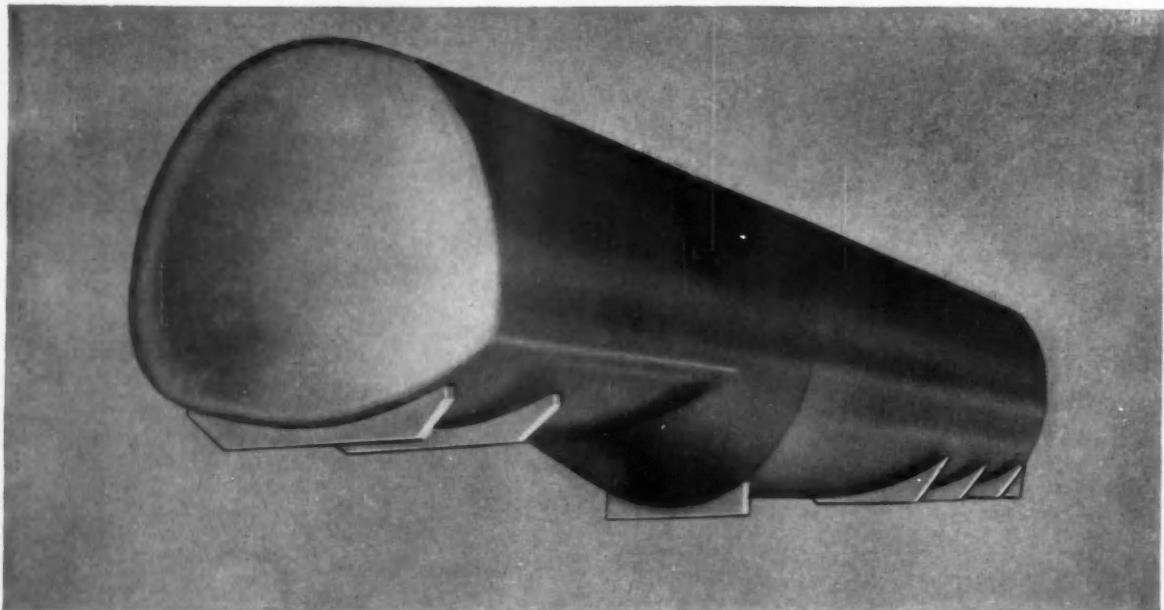
Sent free on request — diagrams, capacity tables, dimensions, and complete specifications. State your problem — COTTA engineers will help you select the right unit for best performance. Write today.

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS

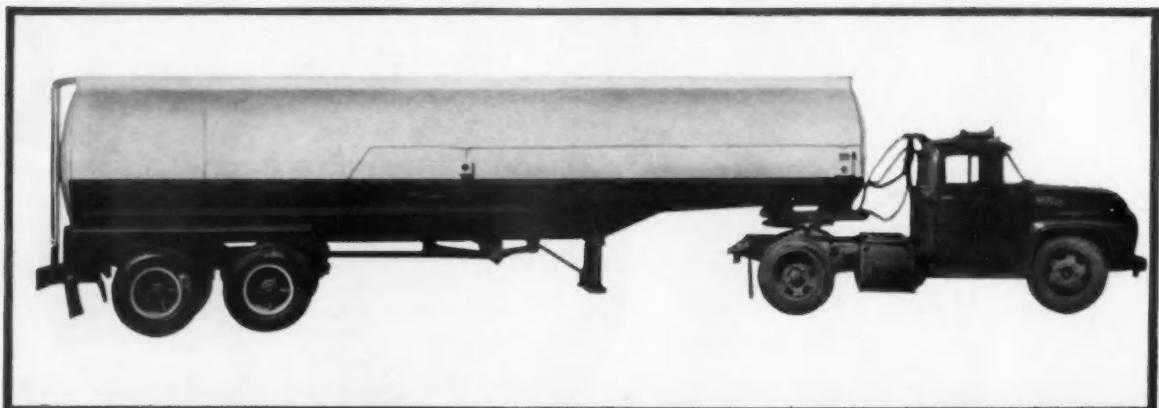


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**HEAVY-DUTY**  
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"Engineered-to-order"



**Nickel-Copper** high strength low alloy steel helps Butler Manufacturing Company, Kansas City, Mo., increase capacity of frameless unit . . . enabling transport to haul . . .



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- (2) Increase payload capacity without increasing total weight or power demands.

Send for a copy of "Nickel-Copper High Strength Low Alloy Steels."



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# AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE PUBLISHED SEMI-MONTHLY

SEPTEMBER 1, 1956

VOL. 115, NO. 5

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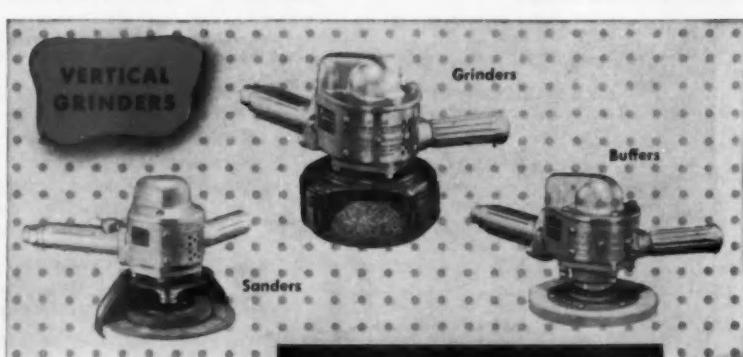
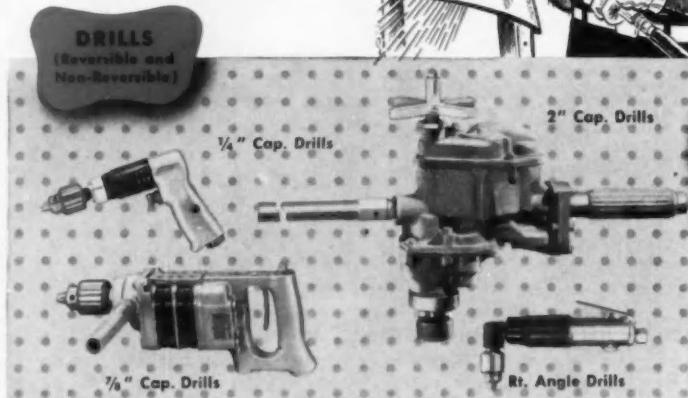
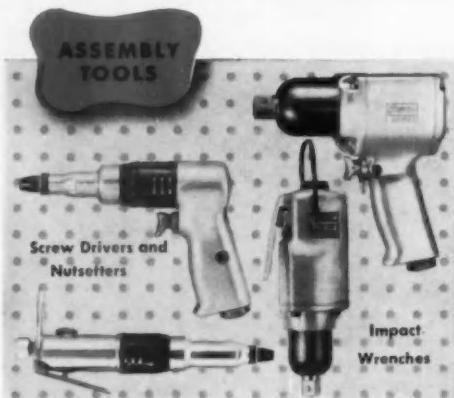
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● Write for Bulletin 53 giving specifications on complete line of Rotor Tools for all industry. The ROTOR TOOL Company, Cleveland 32, Ohio.

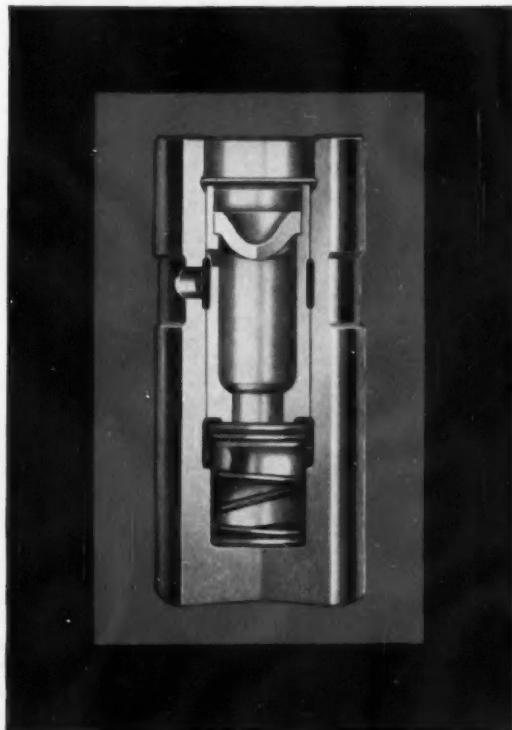
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Eliminate lash maintenance for the life of the engine

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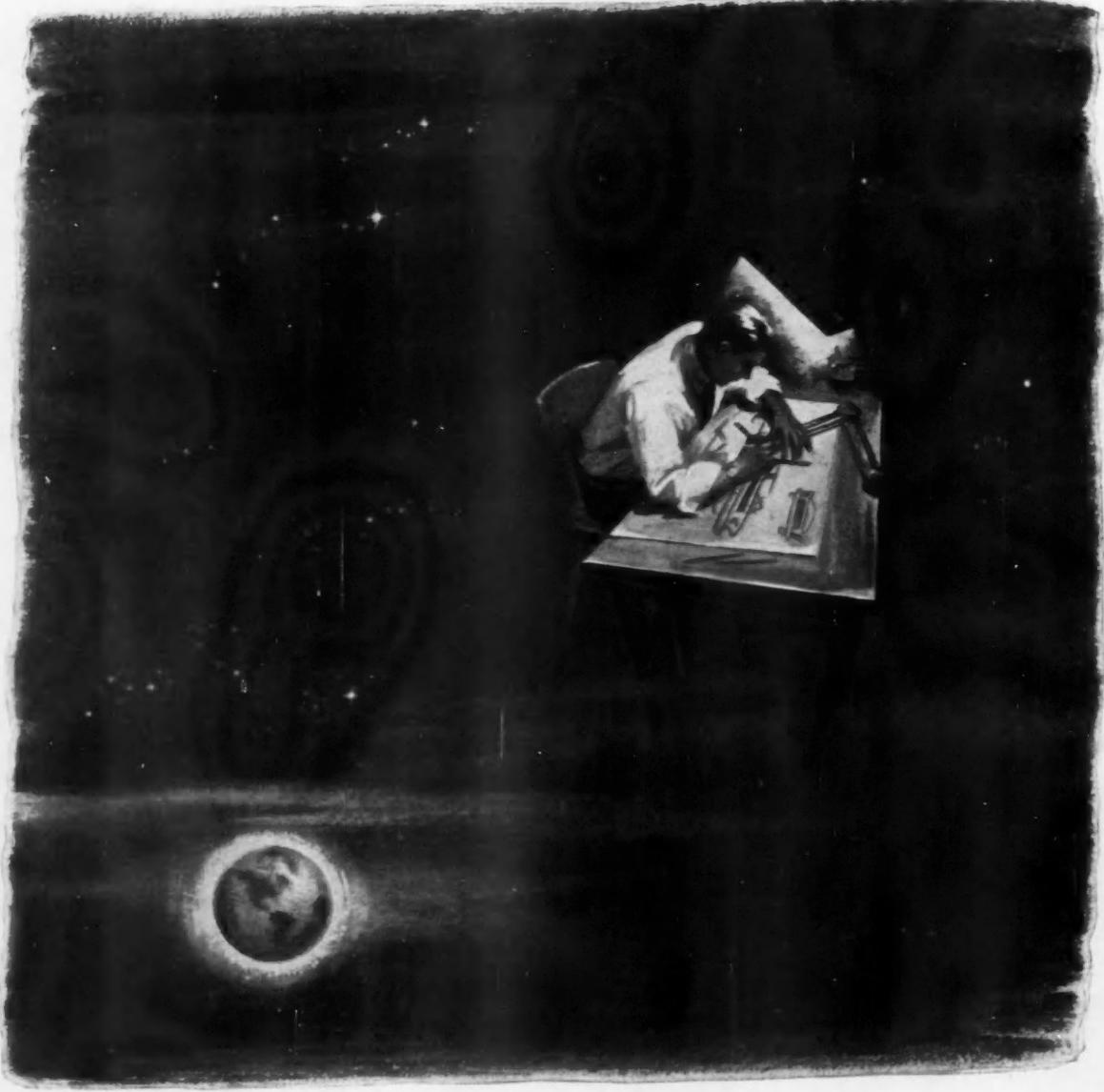


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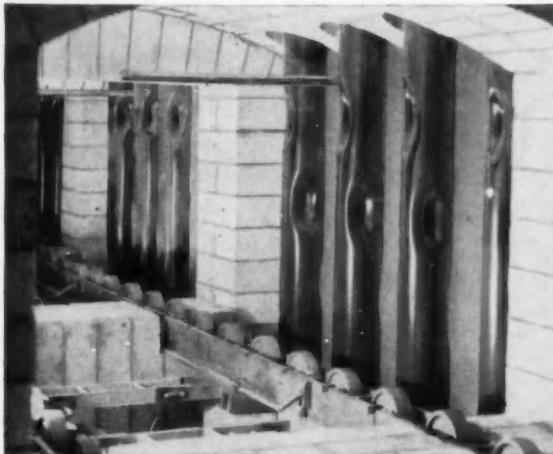


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# LINDBERG HEAT TREATING FURNACES OFFER THESE EXCLUSIVE ADVANTAGES

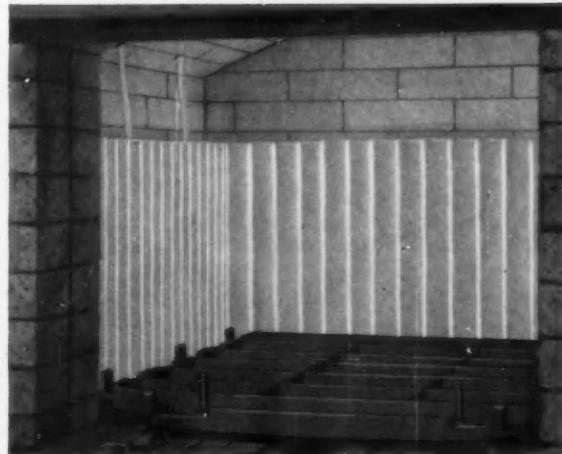


## ... IN THE GAS-FIRED FURNACE NEW LINDBERG VERTICAL RADIANT TUBE

Because of its revolutionary design, this tube provides a new level of gas-fired furnace performance. The secret lies in the new Lindberg tube's "dimples." The tube carries a central stream of mixed air-and-gas surrounded by a cylindrical stream of air alone. Combustion occurs in the area between these two streams. The "dimples" create eddies accelerating combustion and maintaining even temperatures along the entire tube.

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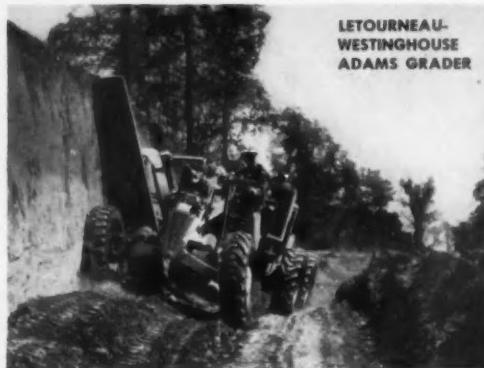
Lindberg Field representatives in 21 cities are ready to show you how Lindberg furnaces with these revolutionary new elements can improve your heat treating process. You'll find your Lindberg representative's name in the classified section of the phone book or write us direct.

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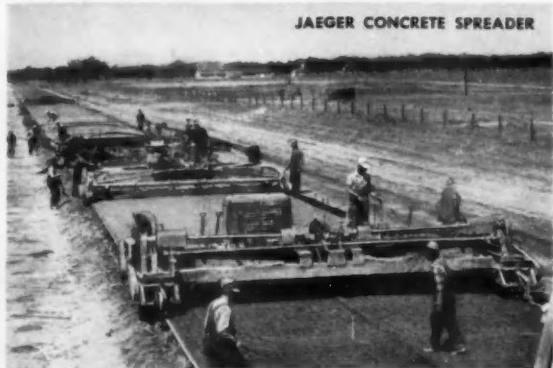
LINDBERG ENGINEERING COMPANY

2491 W. Hubbard Street • Chicago 12, Illinois

## Designers of the latest types of road

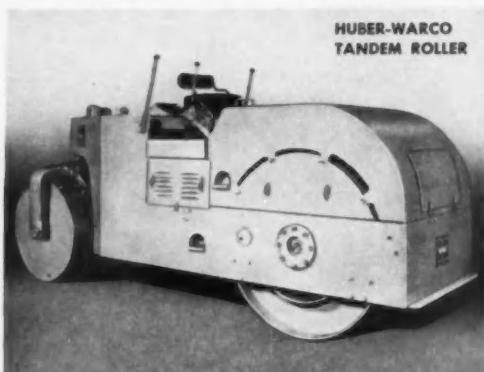


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### **BLOOD BROTHERS MACHINE DIVISION**

ROCKWELL SPRING AND AXLE COMPANY  
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AND DRIVE LINE  
ASSEMBLIES

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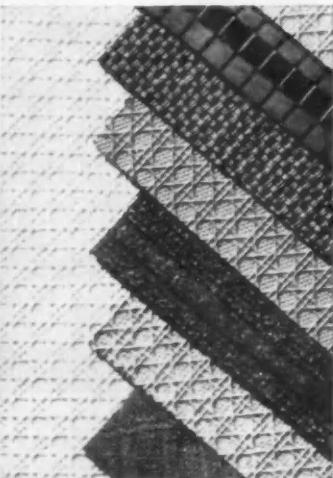
# B.F.Goodrich Chemical *raw materials*



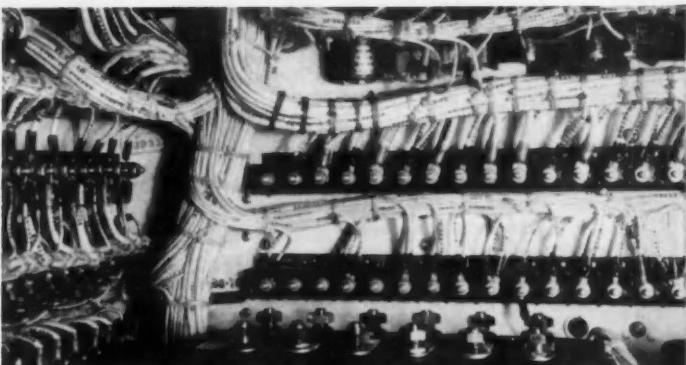
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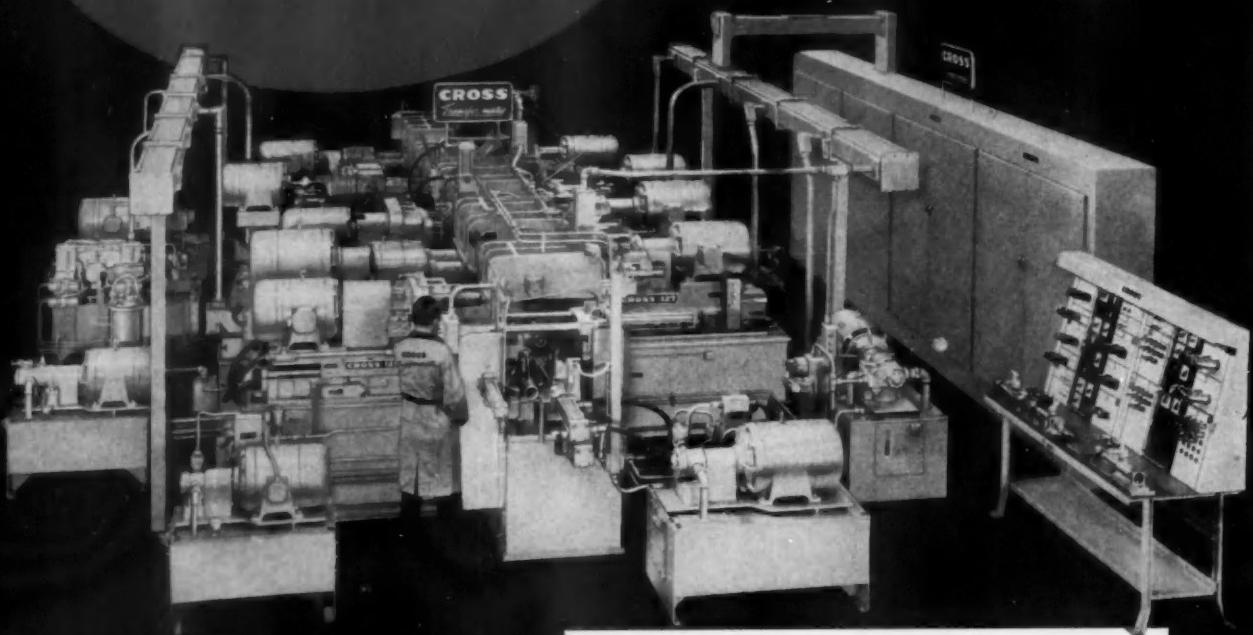
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*Another Transfer-matic by Cross*

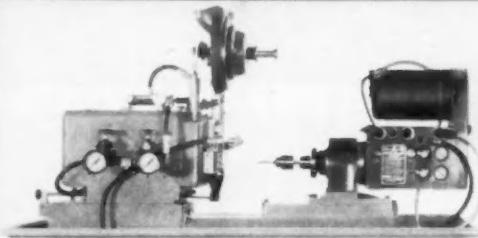


- ★ Rough and finish bores two tube holes; rough and semi-finish bores differential case bearing seats; rough and semi-finishes pinion shaft bore; drills, chamfers and taps ten cover screw holes.
- ★ 75 pieces per hour at 100% efficiency.
- ★ Twenty-two stations: one for loading, one for unloading, four for boring, two for back-boring, two for drilling, one for tapping, one for turnover and ten for inspection.
- ★ Lift and carry transfer mechanism.
- ★ Cross Modular Unit Construction provides flexibility for part design changes.
- ★ All parts in Cross Machines—even details—are made to interchangeable tolerances for fast, easy maintenance.
- ★ Other features: Construction to JIC standards, hardened and ground ways, hydraulic feed and rapid traverse for boring and drilling, individual lead screw feed for tapping, automatic lubrication.

Established 1898

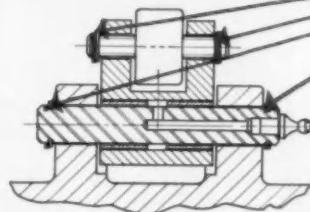
THE **CROSS** CO.  
*First in Automation*  
DETROIT 7, MICHIGAN

# Waldes Truarc Retaining Rings Eliminate Machining and Parts—Cut Assembly Time on Drill and Tapper



## Beco Model 410 Drill and Tapper

The Batchelder Engineering Co., Inc., Springfield, Vermont uses 4 different sizes of 2 different type Waldes Truarc rings in their new BECO Model 410 Automatic Drill and Tapper. Truarc rings speed assembly, reduce machining, improve design.

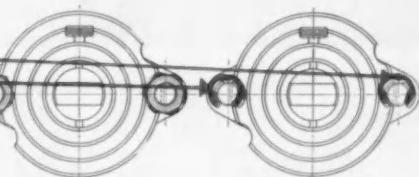


## Bell Crank Pivot Assembly

Truarc Rings (Series 5100) in Bell Crank Pivot assembly permit grease hole not possible with cotter pin fastener. Use of nuts would have increased machining and assembly costs considerably.

**Whatever you make,** there's a Waldes Truarc Retaining Ring designed to improve your product...to save you material, machining and labor costs. They're quick and easy to assemble and disassemble, and they do a better job of holding parts together. Truarc rings are precision engineered and precision made, quality controlled from raw material to finished ring.

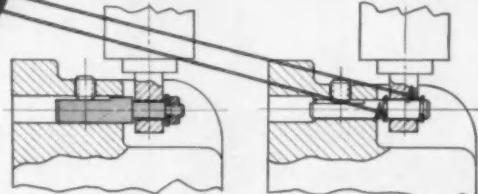
**36 functionally different types...as many as 97**



ALTERNATE DESIGN      TRUARC DESIGN

## Clamp Cylinder Rod Stop Assembly

Truarc "E" Rings (Series 5133) replace stop nuts in the Clamp Cylinder assembly. They eliminate need for threading 2 rods...the danger of cross-threading nuts...and costly rejects. Truarc Rings cut assembly time and cost.



ALTERNATE DESIGN      TRUARC DESIGN

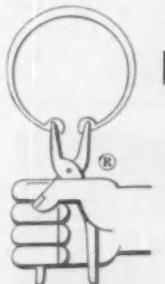
## Hopper Cylinder Anchor Pin Assembly

2 Truarc Rings (Series 5100) secure and position end of vertical air cylinder. Rings eliminate extra cost of machining 3-diameter pin, threading and undercutting...plus nut and washer. Assembly is quick and sure.

different sizes within a type...5 metal specifications and 14 different finishes. Truarc rings are available from 90 stocking points throughout the U. S. A. and Canada.

**More than 30** engineering-minded factory representatives and 700 field men are available to you on call. Send us your blueprints today...let our Truarc engineers help you solve design, assembly and production problems...without obligation.

For precision internal grooving and undercutting...Waldes Truarc Grooving Tool!



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**TRUARC**<sup>®</sup>  
RETAINING RINGS

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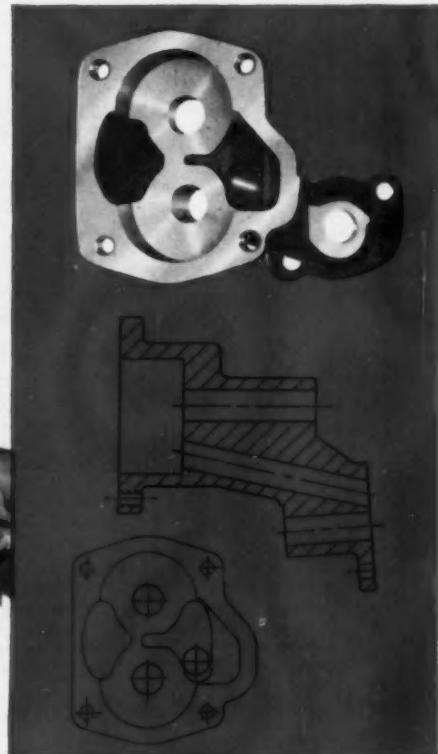
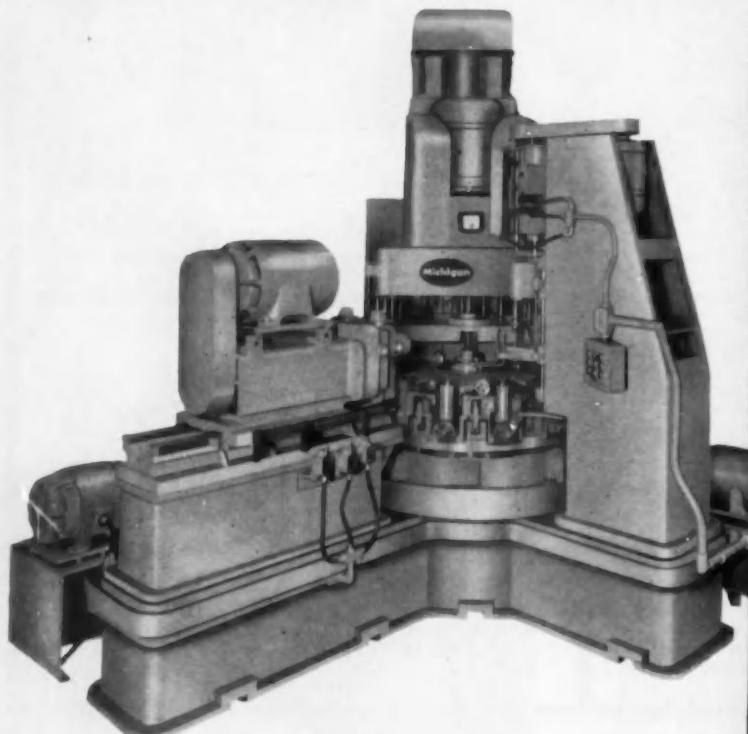
Zone \_\_\_\_\_ State \_\_\_\_\_

AY 098

WALDES TRUARC Retaining Rings, Grooving Tools, Pliers, Applicators and Dispensers are protected by one or more of the following U. S. Patents: 2,382,948; 2,411,426; 2,411,761; 2,416,852; 2,420,921; 2,428,341; 2,439,785; 2,441,846; 2,455,165; 2,483,379; 2,483,380; 2,483,383; 2,487,802; 2,487,803; 2,491,306; 2,491,310; 2,509,081; 2,544,631; 2,546,616; 2,547,263; 2,558,704; 2,574,034; 2,577,319; 2,595,787, and other U. S. Patents pending. Equal patent protection established in foreign countries.

# Here's a Production Team

120 OIL PUMP BODIES



## AUTOMATED OPERATIONS ON MACHINE NO. 1

1. Rough mill the top face.
2. Finish mill the top face.
3. Drill thru the .4845 hole; and, tap drill (2) mounting holes.
4. Drill thru the .4785 hole; and, tap drill (2) mounting holes.

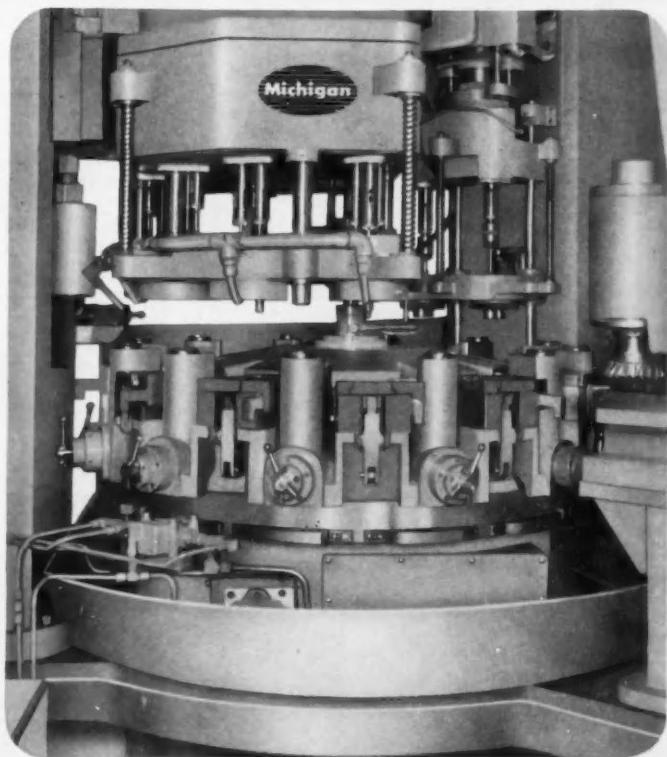
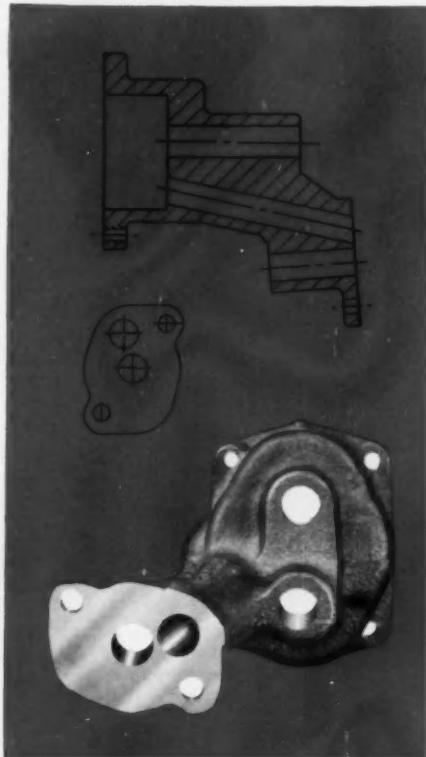
5. Chamfer the .4845 hole; Chamfer the first (2) mounting holes; and, rough bore one gear pocket.
6. Chamfer the .4785 hole; Chamfer the other (2) mounting holes; and rough bore the other gear pocket.
7. Finish bore and square bottom of one gear pocket.

8. Finish bore and square bottom other gear pocket.
  9. Tap all (4) mounting holes in top face.
  10. Finish ream the .4845 hole.
  11. Finish ream the .4785 hole.
- Ready for Second Machine

## For Faster, More Economical Production

# That Will Slash Your Costs!

Completely Finished **E V E R Y H O U R**



## AUTOMATED OPERATIONS ON MACHINE NO. 2

1. Straddle mill the outside lower face; and, inside lower face.	4. Drill the $1\frac{5}{32}$ hole thru.	7. Drill the $\frac{7}{16}$ hole thru.
2. Finish mill the outside lower face.	5. Finish ream the (2) .2491 mounting holes.	Completely Finished.
3. Drill (2) .2491 Mounting holes.	6. Drill the $\frac{7}{16}$ hole halfway thru.	Ready for Assembly.

AND THEY'RE **FINISHED** READY FOR THE PRODUCTION LINE

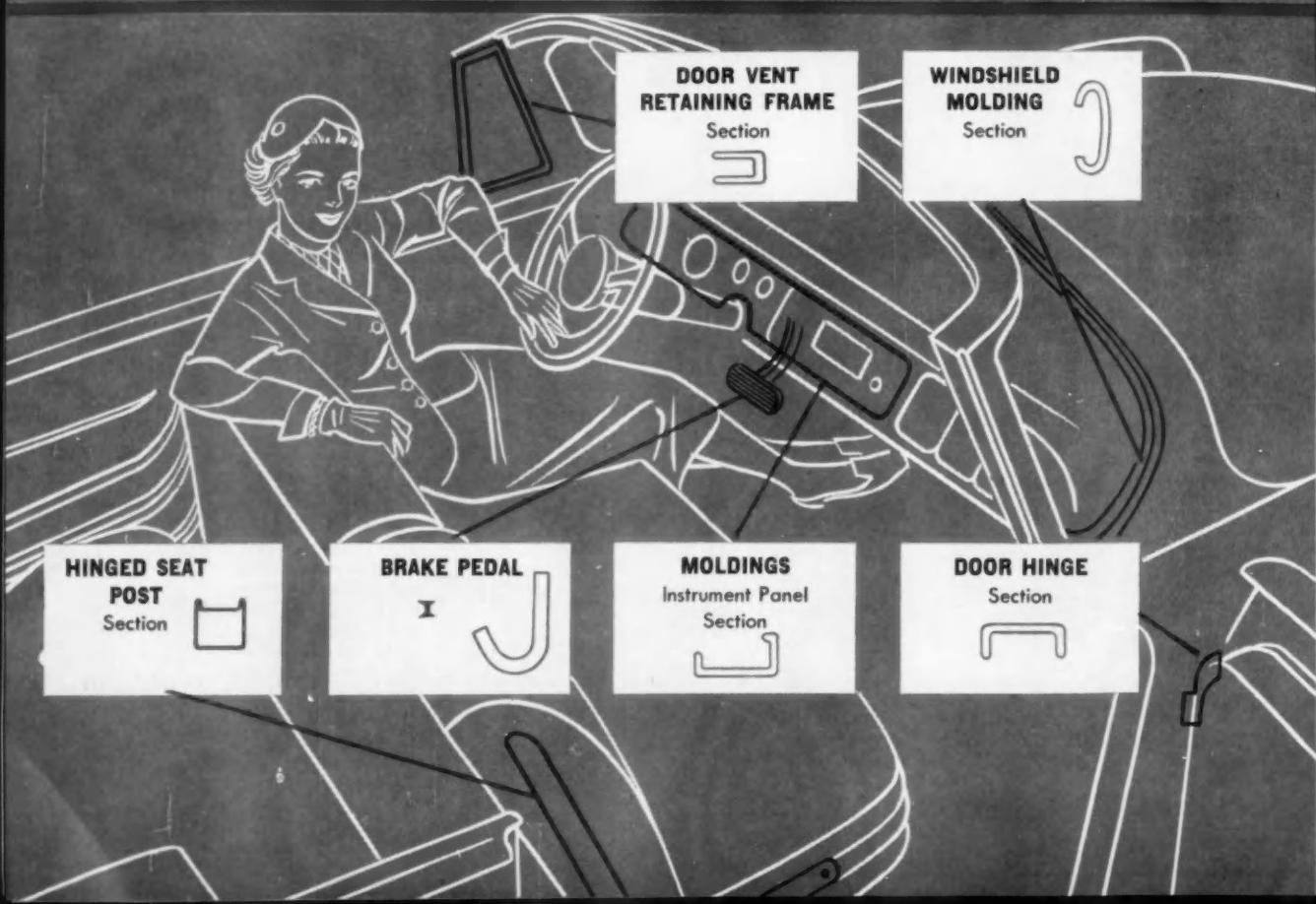
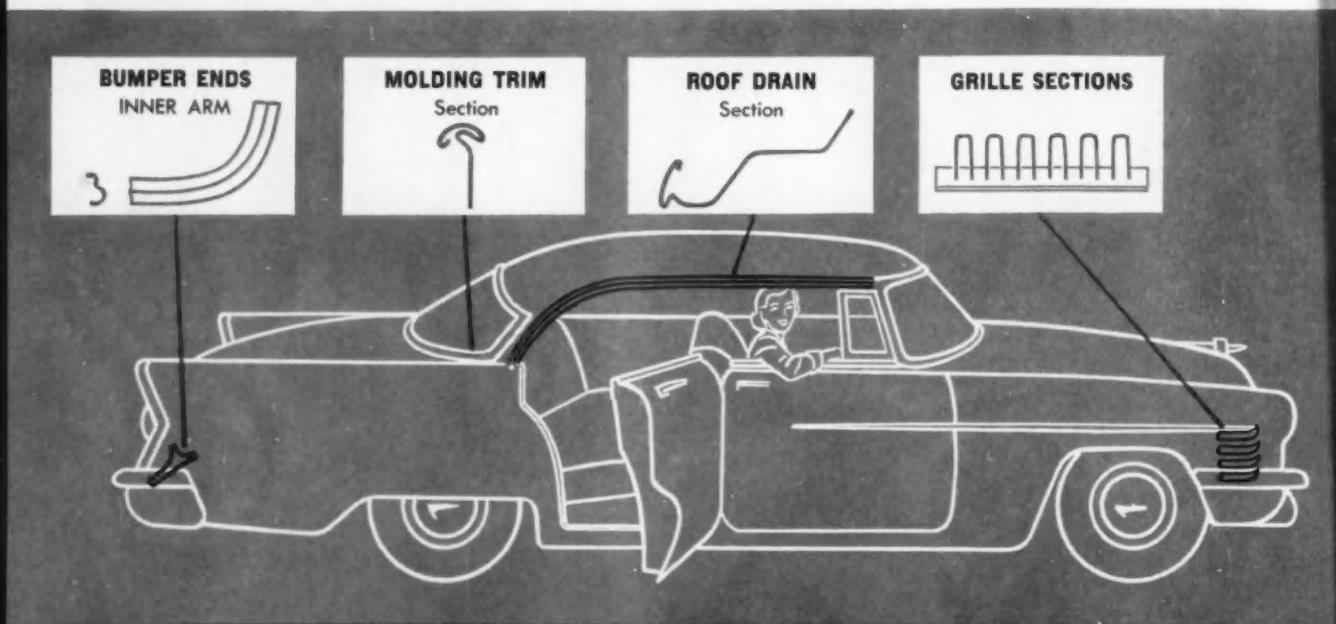


We invite your inquiries regarding our full line of tapping units, and index tables, manual and automatic. Write for Catalog and Engineering Data Sheets.

**DRILL HEAD CO.** Detroit 34, Michigan

engineers and manufacturers of production machines and drilling equipment

# At the service of the Automotive Industry! .....

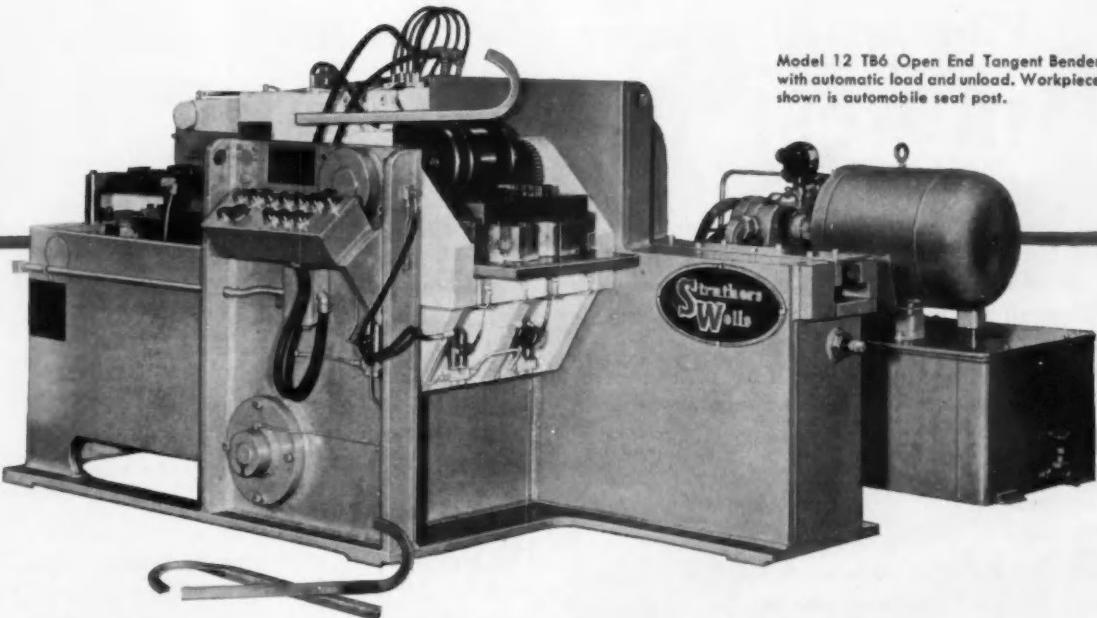


**S truthers  
S W ells**

# ... TANGENT BENDING

of structural parts

For New Production Speed and Economy



Model 12 TB6 Open End Tangent Bender  
with automatic load and unload. Workpiece  
shown is automobile seat post.

Struthers Wells Tangent Bending of preformed material—industry's most modern aid to fast, economical metal styling—is now available for automotive production lines. After intensive development and use in appliance manufacture, Tangent Bending is ready for the most efficient automated processes in the auto-

motive industry, eliminating many present wipe bending problems and high tool maintenance. For full information on the Tangent Bending potential for your own operations, send drawings and anticipated production requirements to us in strict confidence. Our recommendations will go forward promptly, without obligation.

## STRUTHERS WELLS CORPORATION

Machinery Division TITUSVILLE, PENNSYLVANIA

Offices in Principal Cities

### STRUTHERS WELLS PRODUCTS:

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BOILERS for Power and Heat . . . High  
and Low Pressure . . . Water Tube . . .  
Fire Tube . . . Package Units

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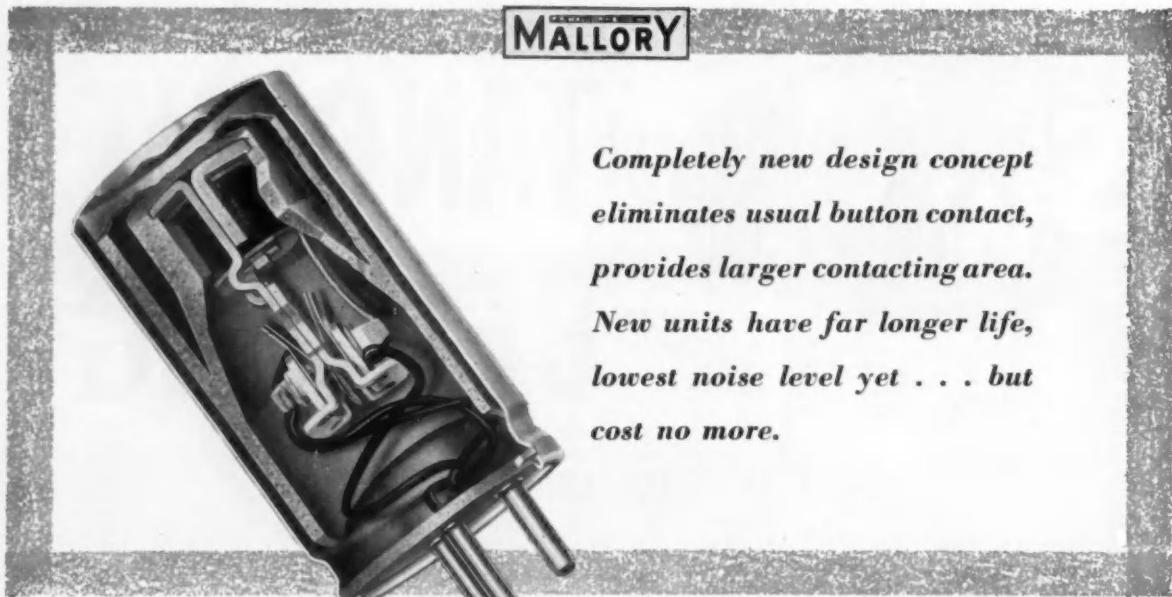
Crankshafts . . . Hydraulic Cylinders  
Pressure Vessels . . . Shafting . . .  
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MACHINERY for Sheet and Structural Metal  
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Machines . . . Reeler Table and Tumble Die  
Bending Machines . . . Press Brakes . . . Punching  
and Notching Machines . . . Forming Dies

**MALLORY**



*Completely new design concept  
eliminates usual button contact,  
provides larger contacting area.  
New units have far longer life,  
lowest noise level yet . . . but  
cost no more.*

## *Vibrator life increased 50 to 100% . . . in newest Mallory design*

STANDARDS of vibrator performance never before possible are being set by the latest development in Mallory vibrator engineering. Through the use of new design and materials, contact is made directly between vibrating reed arm and side arm—eliminating conventional contact buttons—providing far greater contacting area and longer life.

And in addition, a further refinement in the mounting of the vibrator establishes a new high standard of quieter operation.

The results of these new design concepts are important to everyone who designs, makes or uses vibrator-powered equipment.

**Life is increased 50 to 100% . . . due to greater contacting area and far lower rate of wear.**

**Sticking of contacts is eliminated.**

**Complete uniformity** of characteristics is made possible by this simplified design, which permits automatic production and adjustment techniques.

**Extra-quiet operation.** Mechanical hum is held to a new low level, due to the lighter mass of the mechanism, and to noise-squelching Mallory refinements.

**Smaller size** for equivalent load rating.

The new Mallory 1600 series vibrator is now available for auto radios, headlight dimmers, garage door openers and many other applications. In addition, the new leaf spring contacting concept is available in another new Mallory vibrator—the 1700 series for two-way communications equipment and other heavy duty applications.

*Expect more . . . Get more from*

**Serving Industry with These Products:**

**Electromechanical**—Resistors • Switches • Television Tuners • Vibrators

**Electrochemical**—Capacitors • Rectifiers • Mercury Batteries

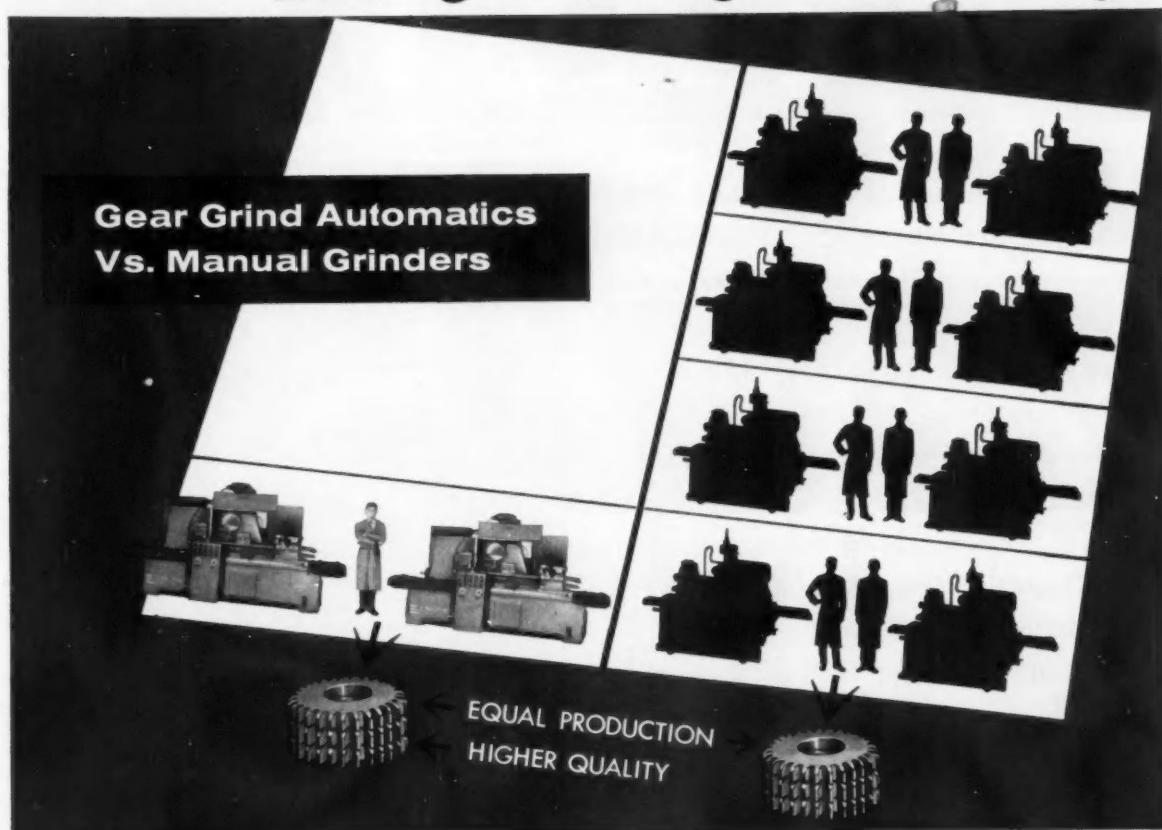
**Metallurgical**—Contacts • Special Metals and Ceramics • Welding Materials

Parts distributors in all major cities stock Mallory standard components for your convenience.

P. R. MALLORY & CO., Inc.  
**MALLORY**

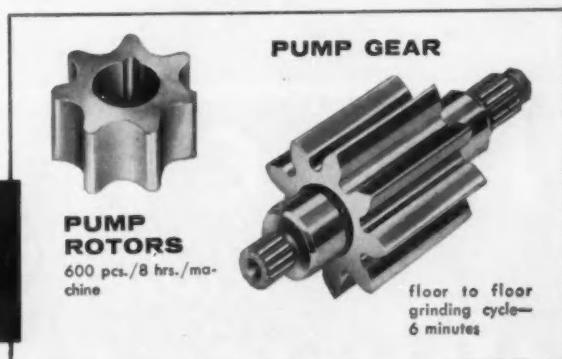
P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

# Here's real grinding economy!



**2 Automatics with 1 Operator Equals  
8 Manuals with 8 Skilled Operators**

$\frac{1}{4}$  the floor space  
 $\frac{1}{4}$  the number of machines  
 $\frac{1}{6}$  the manpower } Gear Grinding Economy



For all the facts—write today!

**THE GEAR GRINDING MACHINE COMPANY**  
3903 Christopher, Detroit 11, Michigan

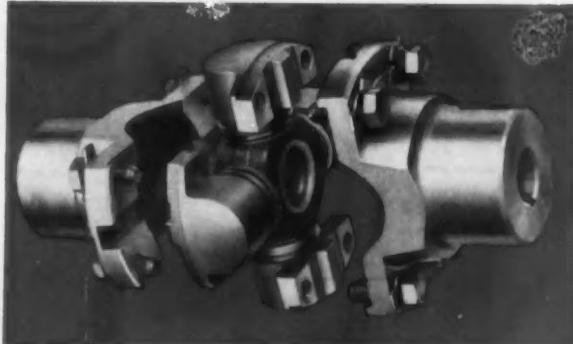
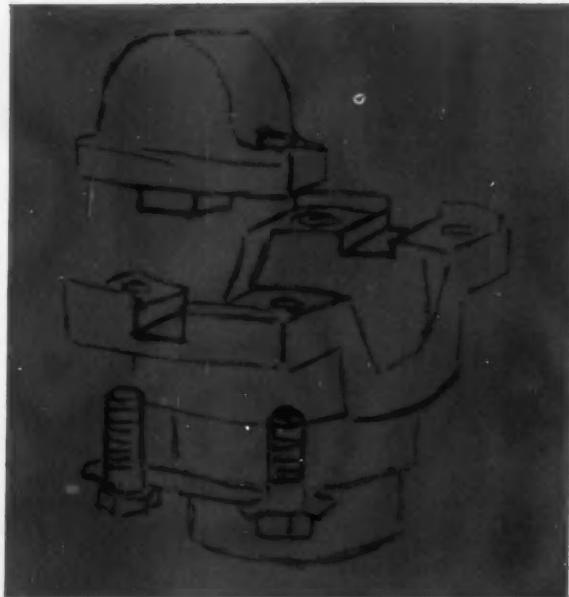
*Manufacturers of:*

The Detroit Screwmatic 750, Automatic Screw Machine.  
RZEPPA ("Sheppa") Constant Velocity Universal Joints

SPECIFY  
KEY-DRIVE  
JOINTS FOR

# FAST ASSEMBLY AND SERVICE OPERATIONS

Unique features of MECHANICS Roller Bearing UNIVERSAL JOINTS make them unusually easy to install and service. The complete cross and bearing assembly can be removed simply by taking out the cap screws and separating the end yokes slightly. No flange is required for drive shaft connections. Accurately and durably built for long, heavy service, MECHANICS Roller Bearing UNIVERSAL JOINTS are inherently balanced for smooth operation.



Let our engineers show you how MECHANICS close-coupled Roller Bearing UNIVERSAL JOINTS conserve space and compensate for offset shafts, in your new and improved models.

**MECHANICS UNIVERSAL JOINT DIVISION**  
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Export Sales: Borg-Warner International  
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# MECHANICS *Roller Bearing* UNIVERSAL JOINTS

For Cars • Trucks • Tractors • Farm Implements • Road Machinery •  
Aircraft • Tanks • Busses and Industrial Equipment

## 5th in a Series

OF HIGH PRODUCTION CASE HISTORIES

### Baird Automatic Chucker again hits PEAK PRODUCTION

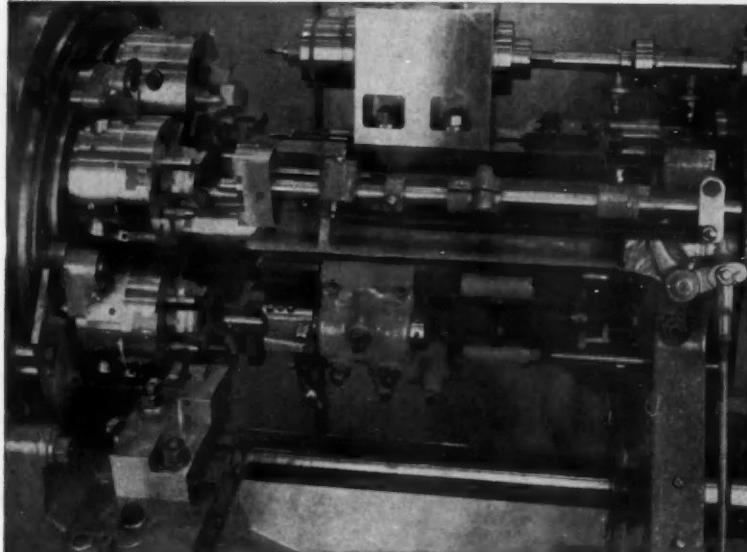
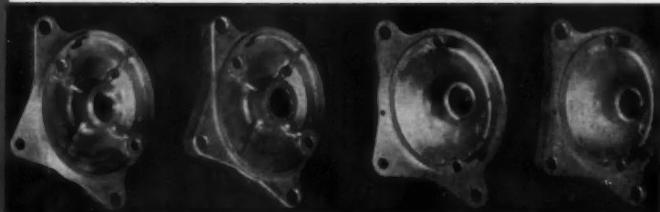


PART: Back End Plate of Starter Motor

MATERIAL: Die-Cast Aluminum

PRODUCTION:

**420 PIECES PER HOUR**



#### OPERATIONS

Back face and chamfer one end of hub, using a recessing tool. Bore center hole concentric with flange diameters with high speed boring head. Face both sides of flange and turn the diameters concentric with hole. Bore a small hole off center with high speed boring head and tap two holes. The work is located in proper position and held stationary while the off-center hole is bored and the two holes tapped.

#### TOOLING...

The Baird Automatic 76H Chucking Machine is arranged for single indexing and with a recessing tool for back facing . . . high speed boring heads . . . two-spindle lead screw tapping attachment. A typical example of the endlessly varied and basically simple arrangements possible with this versatile unit.

Write Dept. AI.

THE BAIRD MACHINE COMPANY

STRATFORD

CONNECTICUT

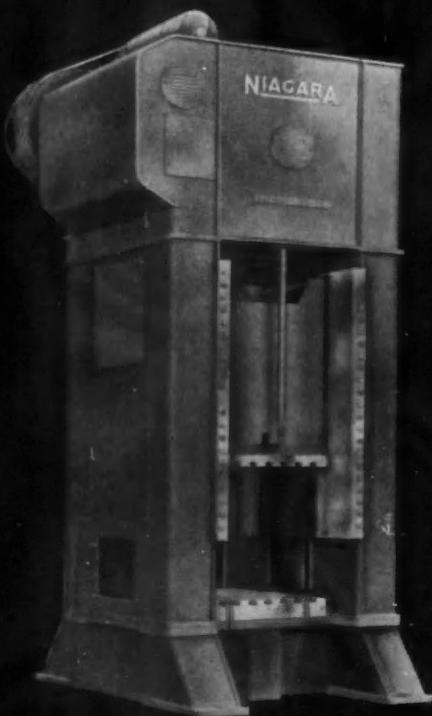
WHERE YOU WILL GET THE HELP OF SPECIALISTS  
ON THESE ESSENTIAL PRODUCTION PROBLEMS:

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL  
FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

98489

# NEW!

## MASTERFULLY ENGINEERED excels in large, heavy tonnage



One-point suspension. 100 through 1000-ton capacities.



Four-point suspension. 200 through 1000-ton capacities.

### ► ECCENTRIC DRIVE DELIVERS GREATER TORQUE WITH LESS DEFLECTION

In Niagara Series SE Presses, the eccentric is an integral part of the main gear (or gears) which rotates on a stationary pin rigidly supported in the crown, close to the point at which the pressure is exerted. Serving merely as a pivot, the pin carries no torsional load and relatively little bending load. Net result: Niagara's eccentric gear design can deliver greater torque with less deflection than other types of construction.

### ► RUGGED, RIGID, ALL-STEEL FRAMES PROVIDE GREATER ACCURACY, LONGER DIE LIFE

Frames are rugged, all-steel, four-piece, tie-rod construction of great strength and rigidity, stress relieved in a furnace and thoroughly grit-blasted before machining. Each frame size has been scientifically tested for deflection to meet Niagara standards—the most exacting in the industry.

### ► LOW INERTIA, PNEUMATIC FRICTION CLUTCH RUNS COOLER, WEARS LONGER

Most of the weight of the Niagara clutch continues to rotate with the flywheel. Only the drive shaft and driving plate start and stop with each cycle. The resulting low weight and inertia of the parts, picked up during clutch engagement, greatly reduce heat and wear. As the clutch rotates, it acts as a centrifugal blower, providing positive ventilation. Plates automatically compensate for normal wear, with no adjustment necessary.

### ► MODERN, STREAMLINED DESIGN EMPHASIZES COMPACTNESS

The entire driving assembly is neatly housed in the crown. There is no exposed, overhanging flywheel, clutch, brake, shaft nor motor in the rear of the press to obstruct crane service, block light, throw grease or consume space unnecessarily.

# LINE OF METALWORKING CHAMPIONS

## drawing, punching and blanking work



Two-point suspension. 200 through 1000-ton capacities.

### DELUXE OPERATING CONTROLS INSURE UTMOST SAFETY, EFFICIENCY AND CONVENIENCE

Compactly and conveniently arranged on a master panel, Niagara controls are instantly accessible for fingertip direction of every press operation: starting, slide adjusting, jogging, die tryouts, running and stopping. The latest safety devices provide maximum protection for die setter, operator and the press itself. Nothing has been overlooked. Trial runs assure that all controls are in proper working order before each Niagara press leaves the plant.

Without equal in engineering design, performance and stamina, this great new line of Niagara Straight Side Eccentric Geared Presses is every inch a champion. It is an outstanding example of the advanced thinking that has made Niagara the pace-setter among builders of metal working machines for 75 years.

Masterfully engineered and ruggedly constructed to handle a tremendous variety of work, the new Niagara SE Series is the most practical and dependable press line built for:

- Work requiring large die areas.
- Heavy tonnage demands.
- Long stroke, deep drawing jobs where work is engaged high up on the stroke.
- Bottom-of-stroke blanking and punching.

### THE COMPLETE STORY IS READY FOR YOU NOW!

Make a feature-by-feature appraisal of what these great new presses can do for you. Write for newly published, illustrated Bulletin 66. It will be forwarded promptly without obligation.



NIAGARA MACHINE & TOOL WORKS • BUFFALO, N.Y.  
DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA  
Dealers in principal U. S. cities and major foreign countries.

**NIAGARA**  
**STRAIGHT SIDE**  
**ECCENTRIC GEARED**  
**PRESSES**

# NEW



No. 3-36 . . . 36" table travel  
42" x 64" x 16" table . . . full  
automatic hydraulic feed.

## No. 3-36

### HYDRAULIC MILLING MACHINE

Now—the family of Kent-Owens Milling Machines has expanded to give you the same unexcelled milling accuracy, speed and dependability for *larger size work!*

Proudly we present the No. 3-36 Hydraulic Milling Machine . . . the new "big brother" in the line of popular Kent-Owens Millers. Each Kent-Owens machine is ruggedly designed with advanced features throughout for greater dependability and accuracy to maintain tough production schedules. Write for bulletin 955 on wide range of hydraulic and hand-operated machines. Also, let Kent-Owens design and build your tooling and special machines.

Kent-Owens Machine Co., Toledo, O.

*Call on*

## KENT-OWENS

for MILLING MACHINES

### KENT-OWENS REPRESENTATIVES

BOSTON  
General Electric Corp.  
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**Simple...  
Rugged...Efficient**



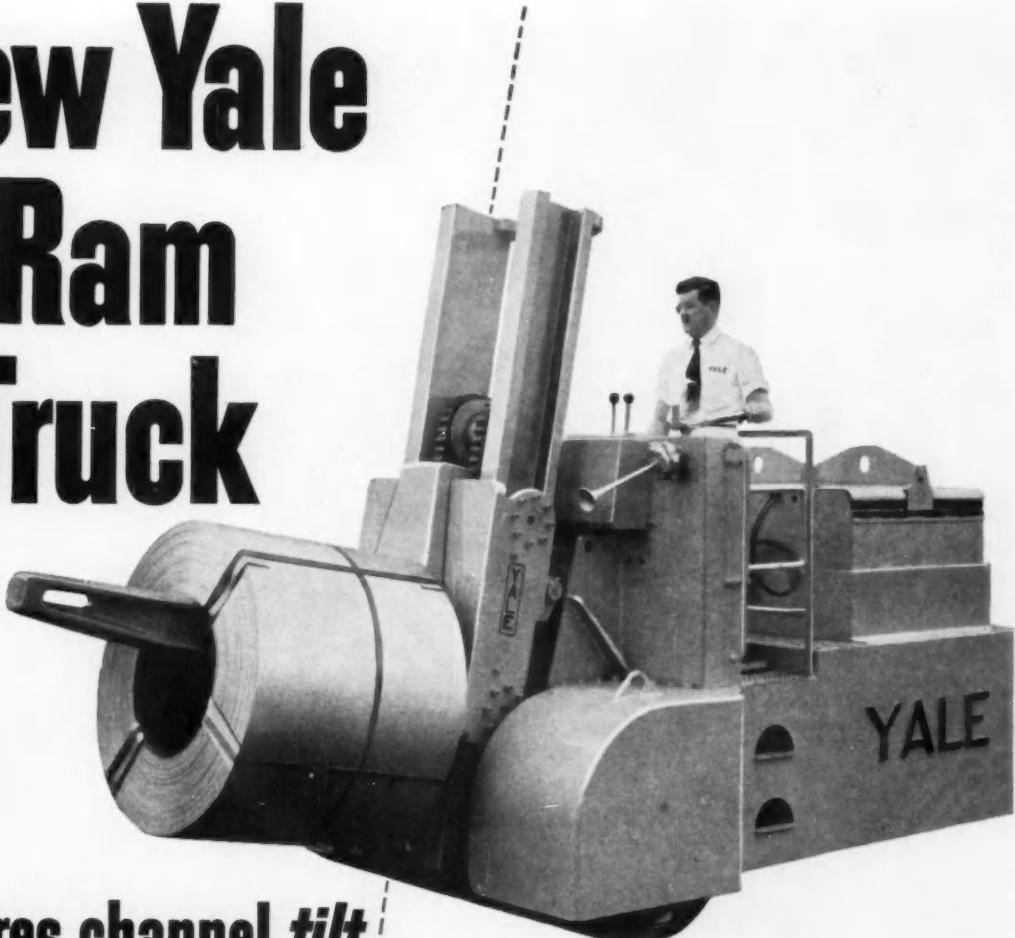
No. 2-20DS . . .  
Double Spindle  
for two milling  
operations . . . 20"  
table travel . . .  
42" x 12" table.  
Hydraulic feed.

No. 1-14 . . . 14"  
table travel . . .  
32" x 9" table . . .  
hydraulic table  
feed . . . full auto-  
matic cycle.

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20" table travel  
42" x 12"  
table . . . full  
automatic hy-  
draulic feed.

No. 1-M . . . Hand  
feed to table and  
head . . . 25" x 9"  
table . . . 12" table  
travel . . . head  
counter-balance  
is adjustable.

# New Yale Ram Truck



**Features channel tilt  
plus two brake systems  
for greater safety**

Now, Yale offers you a complete new line of Electric Ram Trucks in capacities from 18,000 to 30,000 lbs. with features designed to provide maximum safety, speed and ease in handling heavy loads. These features include: (1) Channel tilt 3 degrees forward for easy pick-up of coils, 5 degrees backward for secure positioning of the load to prevent load sliding in transport; (2) Two sets of brakes for security—mechanical motor brake for parking and hydraulic service brakes, mounted within the wheels; (3) Hydraulic power steering giving the operator positive control of every truck movement; (4) Dual controls allowing operation from either side of the truck and providing clear visibility for accurate spotting of loads in tight, congested areas.

For further, more detailed facts about the important safety and operating features of this new Yale Ram Truck, write The Yale & Towne Mfg. Co., Philadelphia 15, Pa., Dept. 79.

#### **Additional features of the Yale K48:**

- Elevating carriage is roller mounted and equipped with side thrust rollers for greater load stability.
- Motor brake has "dead man" control, cuts off power and applies brake when operator leaves the truck.
- Yale exclusive magnetic Cam-O-Tactor controller provides smooth acceleration.
- Use of "dead axle" in the drive unit gives the truck added strength where load concentration is high.
- Yale K48 Ram Trucks are available in battery or engine generator powered models with either forks, single or split ram.

**YALE\***  
**INDUSTRIAL LIFT TRUCKS AND HOISTS**

\*REG. U. S. PAT. OFF.

Gas, Electric & LP-Gas Industrial Trucks • Worksavers • Warehouses • Hand Trucks • Hand and Electric Hoists



**There is NO SUBSTITUTE for a forging:  
NO SUBSTITUTE for  
Wyman-Gordon Experience**

There is more to the superiority of the forged crankshaft than just strength.

No other method of fabrication can compare with the forging process for dependability. The uniformity and predictability of physical properties with minimum variance from piece to piece or from one location to another in the same piece is assured to the greatest degree by modern forging practice.

Top automotive engineers agree that the use of a forged crankshaft permits the design of a more compact engine which is

a decided advantage when thinking in terms of limited space available and overall engine weight reduction.

As compression ratios increase and engine outputs go up the risk factor must be reduced. Again, the uniformity of quality in the backbone of the engine, the crankshaft, is most essential and made possible only by a forging.

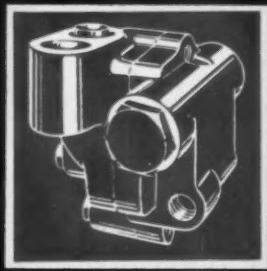
There is NO SUBSTITUTE for a forging and in a forging there is NO SUBSTITUTE for WYMAN-GORDON quality and experience.

# **WYMAN-GORDON COMPANY**

*Established 1883*

**FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM**  
WORCESTER 1, MASSACHUSETTS  
HARVEY, ILLINOIS • DETROIT, MICHIGAN

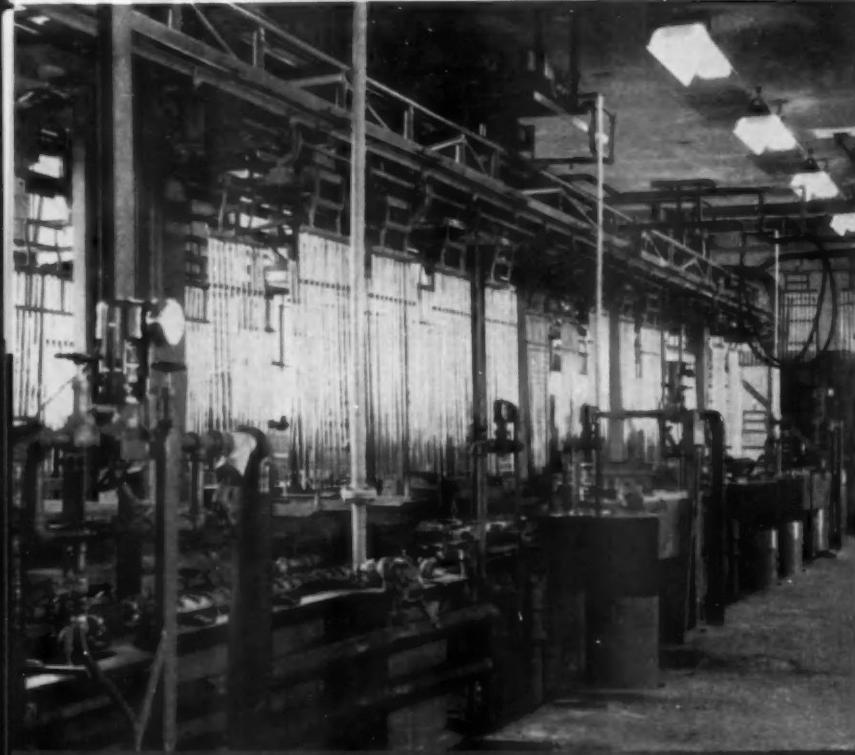
# EATON PUMPS



*The Pump Source of  
the Automotive Industry*

EATON MANUFACTURING COMPANY  
*Pump Division*

9771 French Road • Detroit 13, Michigan



## PLATING 2000 GOLF SHAFTS AN HOUR ON THE UDYLITE FULL AUTOMATIC

### True Temper Profits with Plating Precision

Smooth operation of the Udylite Full Automatic machine has made the big difference in the nickel and chrome plating of golf shafts. The rejections due to plating defects are negligible as positive automatic action eliminated the constant hazards of hand operations.

The regulated speed of lift allows sufficient time for drainage resulting in saving some 50% of the plating solutions formerly lost—a considerable reduction in the use of nickel and chromic acid.

Plate deposit is controlled very closely—this equipment produces 2000 pieces per hour all with a fine degree of uniformity. The variable speeds of the machine itself permit True Temper to predetermine and maintain the plate deposit without changing the time or efficiency of the cleaning cycle.

These and many other unique advantages of Udylite engineering are shown in the new Full Automatic bulletin—write for your free copy.

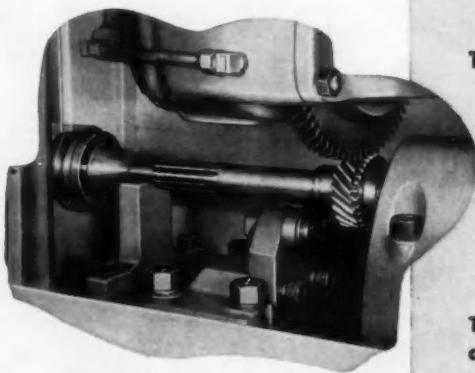
THE  
**Udylite**  
CORPORATION  
DETROIT 11, MICHIGAN

WORLD'S LARGEST  
PLATING SUPPLIER

## CALENDAR OF COMING SHOWS AND MEETINGS

Farnborough Air Show, England	Sept. 3-9
Metal Powder Association, fall meeting, Homestead, Hot Springs, Va.	Sept. 7-9
American Institute of Chemical Engineers, fall meeting, Wm. Penn Hotel, Pittsburgh, Pa.	Sept. 9-12
ASME Fall Meeting, Cosmopolitan Hotel, Denver, Colo.	Sept. 10-13
SAE National Tractor Meeting and Production Forum, Hotel Schroeder, Milwaukee, Wis.	Sept. 10-13
American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago, Ill.	Sept. 11-13
Packaging Machinery & Materials Exposition, Public Auditorium, Cleveland, O.	Sept. 11-14
National Petroleum Association, annual meeting, Traymore Hotel, Atlantic City, N. J.	Sept. 12-14
American Chemical Society, annual meeting, Atlantic City, N. J.	Sept. 16-21
Instrument - Automation Conference and Exhibit, Coliseum, New York, N. Y.	Sept. 17-21
International Commercial Motor Transport Show, Earls Court, London, England	Sept. 21-29
ASME Petroleum-Mechanical Engineering Conference, Conrad Hilton Hotel, Dallas Tex.	Sept. 23-26
Trade Fair of the Atomic Industry, Navy Pier, Chicago, Ill.	Sept. 24-28
Atomic Industrial Conference Forum, Morrison Hotel, Chicago, Ill.	Sept. 25-27
National Electronics Conference, Hotel Sherman, Chicago, Ill.	Oct. 1-3
AIEE Fall General Meeting, Morrison Hotel, Chicago, Ill.	Oct. 1-5
Standards Engineers Society, Hotel Willard, Washington, D. C.	Oct. 3-5
SAE National Aeronautic Meeting, Production Forum, and Engineering Display, Hotel Statler, Los Angeles, Calif.	Oct. 2-6
Paris Automobile Show, France	Oct. 4-14
ASME - ASLE Third Lubrication Conference, Chalfonte-Haddon Hall, Atlantic City, N. J.	Oct. 8-10
National Metal Exposition, Public Auditorium, Cleveland, O.	Oct. 8-12
Second Joint Military - Industry Packaging and Materials Handling Symposium, Wash., D. C.	Oct. 9-12
Material Handling Institute, fall meeting, Traymore Hotel, Atlantic City, N. J.	Oct. 10-11
SAE National Transportation Meeting, Hotel New Yorker, New York, N. Y.	Oct. 10-12
National Defense Transportation Association, convention and transportation forum, Salt Lake City, Utah	Oct. 14-17
American Society of Body Engineers, annual convention, Rackham Bldg., Detroit, Mich.	Oct. 17-19
International Motor Show, Earls Court, London, England	Oct. 17-27
National Conference on Industrial Hydraulics, Sherman Hotel, Chicago, Ill.	Oct. 18-19
National Industrial Exposition & Management Conferences, Artillery Armory, Detroit, Mich.	Oct. 22-26
National Safety Congress and Exposition, Chicago, Ill.	Oct. 22-26
National Automobile Show, Coliseum, New York, N. Y.	Dec. 3-16

**INCREASE  
GEAR SHAVING  
OUTPUT  
with  
VERSATILE  
SEMI-  
AUTOMATIC  
LOADING**



Write for Estimated Savings  
on Your Particular Operation.

Plastic Splash-Guard Used for  
Demonstration Only.

The operator handling a conventional rotary gear shaving machine is required to make 7 separate motions for each work part shaved.

With semi-automatic loading this is reduced to just 3 operations.

- ① Place work gear on the pre-locator.
- ② Press the start button.
- ③ Remove the shaved gear.

The rest of the cycle is automatic.

Results are:

- Higher production
- Lower machining costs
- Less operator fatigue
- All the versatility of conventional shaving
- Greater safety
- Operator has ample time to serve 2 or more machines

The approximate work locator and head and tailstock centers or plugs are the only work part changes that are additional to a conventional gear shaver.

Red Ring Shaving Machines, Models GCU and GCI may be equipped with this equipment.



SPUR AND HELICAL GEAR SPECIALISTS  
ORIGINATORS OF ROTARY SHAVING  
AND SPLITTING TOOTH FORM

**NATIONAL BROACH & MACHINE CO.**

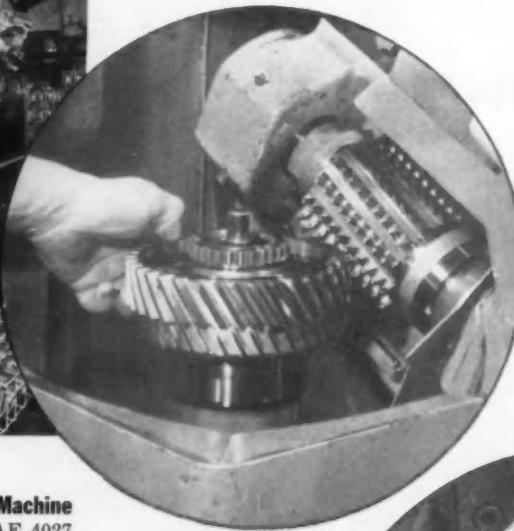
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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

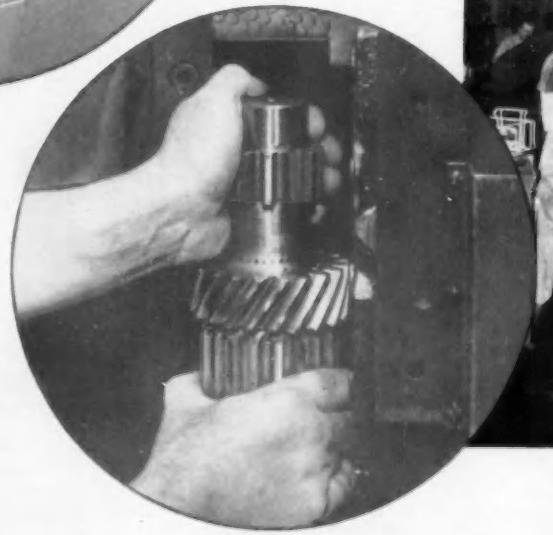


# FOR MILLIONS OF GEARS

...Fellows



**Fellows Heliguide Hobbing Machine**  
cuts a 37-tooth gear in SAE 4027  
carburizing steel on one spindle  
and a 27-tooth gear on the other.  
Production, each spindle: 35 gears  
per hour.



**Fellows No. 4GS Gear Shaper** cuts  
twelve 32-tooth, 7" P.D.,  $\frac{3}{8}$ " face  
helical gears per hour or seven 15-  
tooth, 6" P.D., 2-1/16" face spur  
gears per hour. Set-up shown is for  
20-tooth helical or countershaft.

THE  
PRECISION  
LINE

# A YEAR

## Speed and Accuracy!

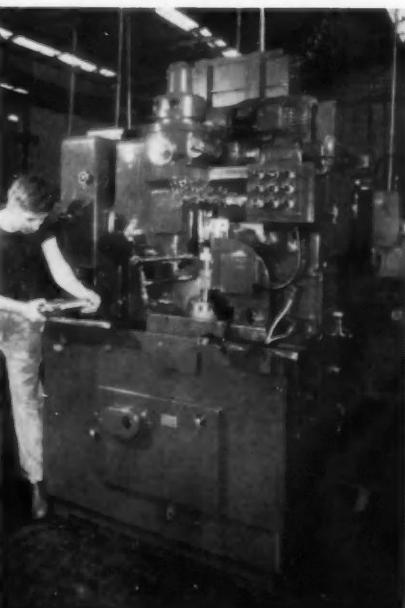
Over nine million gears a year for truck transmissions and other major sub-contracting jobs are made by the famous New Process Gear Company, Syracuse, N. Y. Their records show that because of their speed and accuracy their new Fellows Gear Production machines have lowered cutting costs by more than half!

For example, the Fellows Heliguide two-spindle hobbing machine at New Process cuts *six times* as many gears per hour as the previous machine. In addition, it saves approximately two hours in set-up time, requires only one operator to watch it because of its easy push-button operation. One man can operate four of these Fellows high-speed Heliguide Hobbing Machines.

New Process gets similar benefits from each of its ten Fellows No. 4GS Gear Shapers. Cutting 30% faster than the old machines, the No. 4GS Gear Shapers also hold to 25% closer tolerance without difficulty, saving on set-up time.

For full information about the complete Precision Line of Fellows Gear Production Equipment, get in touch with your Fellows representative. Write, wire or 'phone any Fellows Office.

THE FELLOWS GEAR SHAPER COMPANY  
78 River Street, Springfield, Vermont  
Branch Offices: 319 Fisher Building, Detroit 2  
150 West Pleasant Avenue, Maywood, N. J.  
5835 West North Avenue, Chicago 39  
6214 West Manchester Avenue, Los Angeles 45



**Fellows** Gear Production Equipment

# *Serving Industry with*

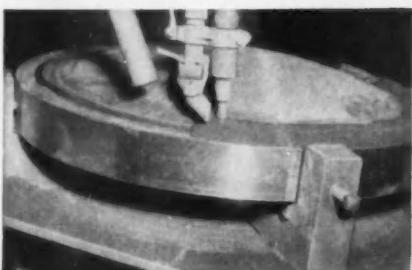
## **MODERN METHODS**

### **for Joining Metals**



#### **SIGMA WELDING**

A high speed, automatic fusion welding process. . . . Employs argon gas to protect weld area from contamination. Joins all commercially fabricated metals, and attains high production speeds in all operations. Manual and automatic mechanized equipment is available.



#### **"UNIONMELT" WELDING**

Makes sound welds up to  $1\frac{1}{2}$  in. thick in one pass. This plus high welding speeds make it the most economical process for a wide range of fabricating and repair jobs. Both portable manual, and automatic mechanized setups are available.



#### **"HELIARC" WELDING**

Ideal for light gage metals. . . . Joins all commercial metals. Welding can be done in all positions on all types of joints with portable manual, semi-automatic, and fully automatic mechanized equipment. Operations are fast and efficient.



#### **OXY-ACETYLENE WELDING, BRAZING, AND SOLDERING**

Permits fabrication and repair of a wide range of structures and parts made of metal. Ideal tools for small shop jobs, to production line operations by large manufacturers.

#### **Linde Air Products Company**

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

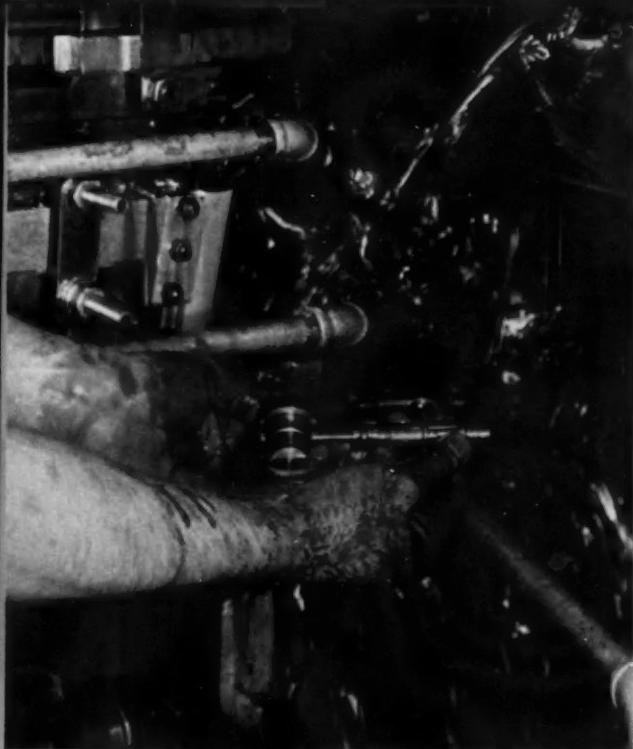
Offices In Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY

Division of Union Carbide Canada Limited, Toronto

The terms "Linde," "Heliarc," and "Unionmelt" are registered trade-marks of Union Carbide.

*Linde*  
Trade-Mark



**Black cutting oil** (left) makes close control difficult. Operators dislike dirty operating conditions it creates. Close control is easier and workers are happier with transparent Sunicut cutting oil (right).

## WHY USE A BLACK CUTTING OIL WHEN YOU DON'T NEED IT?

### Sunicut oils give you better visibility without sacrificing machining efficiency.

When trying to maintain close control over machines producing precision parts, operators can be handicapped by "black-oil blindness". It is hard to see the tools, the workpiece, and the finishes. Checking close tolerances is difficult when the graduations on micrometers and gauges are obscured.

Worse still, as the operator sees it, are the dirty working conditions caused by dark oils. His clothes get saturated with hard-to-remove stains, and his hands are black from one end of the shift to the other.

Transparent Sunicut oils help keep your operators happy and will make close control easier ...and transparent Sunicut oils will do the job with no sacrifice in machining speed or finishes.

To get the full story on Sunicut oils, see your local Sun representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-41.



INDUSTRIAL PRODUCTS DEPARTMENT  
**SUN OIL COMPANY** PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL



*For any machining or grinding operation...*

## **THERE'S A SUN OIL THAT'LL GIVE YOU HIGH EFFICIENCY AND LOW OVER-ALL COST**

No two machine shops have exactly the same problems when it comes to selecting cutting oils...even when they're running the same job. And, until somebody comes up with the truly universal cutting oil, you can't afford to disregard the importance of oil selection. Here's how Sun can help you.

First, Sun makes a complete line of emulsifying and straight cutting and grinding oils. Second, your Sun representative, backed up by field engineers, has the necessary practical experience to recommend

the oil that will give you both high machining efficiency and low over-all costs.

For the full story about Sun's cutting oils, see your Sun representative...or write **SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-42.**



**INDUSTRIAL PRODUCTS DEPARTMENT**

**SUN OIL COMPANY** PHILADELPHIA 3, PA.

© SUN OIL CO.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

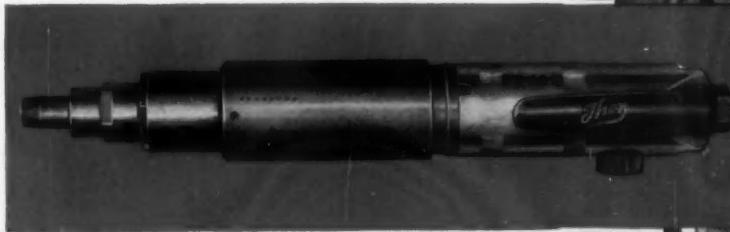
**NEW...for faster assembly**

# THOR UNI-TORK

Air and Electric  
Screwdrivers and Nutsetters



For Uniform Torque  
control of  
threaded fasteners



THOR, pioneer of so many industrial tools, inventor of the automatic screwdriver, has done it again! New Thor Uni-Tork Screwdrivers and Nutsetters completely eliminate operator judgment in the precision driving of threaded fasteners!

Thor Uni-Tork Tools deliver uniform torque output. When desired torque is reached, Uni-Tork snaps out of engagement. No more ratcheting, no slipping, no buzzing of clutch jaws.

Thor Uni-Tork's external torque adjustment, from 10 to 100 inch-pounds, permits faster set-up on any assembly job, holds torque setting indefinitely, saves wear and tear on tools.

All Thor Uni-Tork Air Tools are equipped with Thor Silentair Mufflers, reducing exhaust whine to a whisper. For a demonstration, call your nearest Thor factory branch. Thor Power Tool Company.

**THOR POWER TOOL COMPANY**  
**Aurora, Illinois**

AUTOMOTIVE INDUSTRIES, September 1, 1956

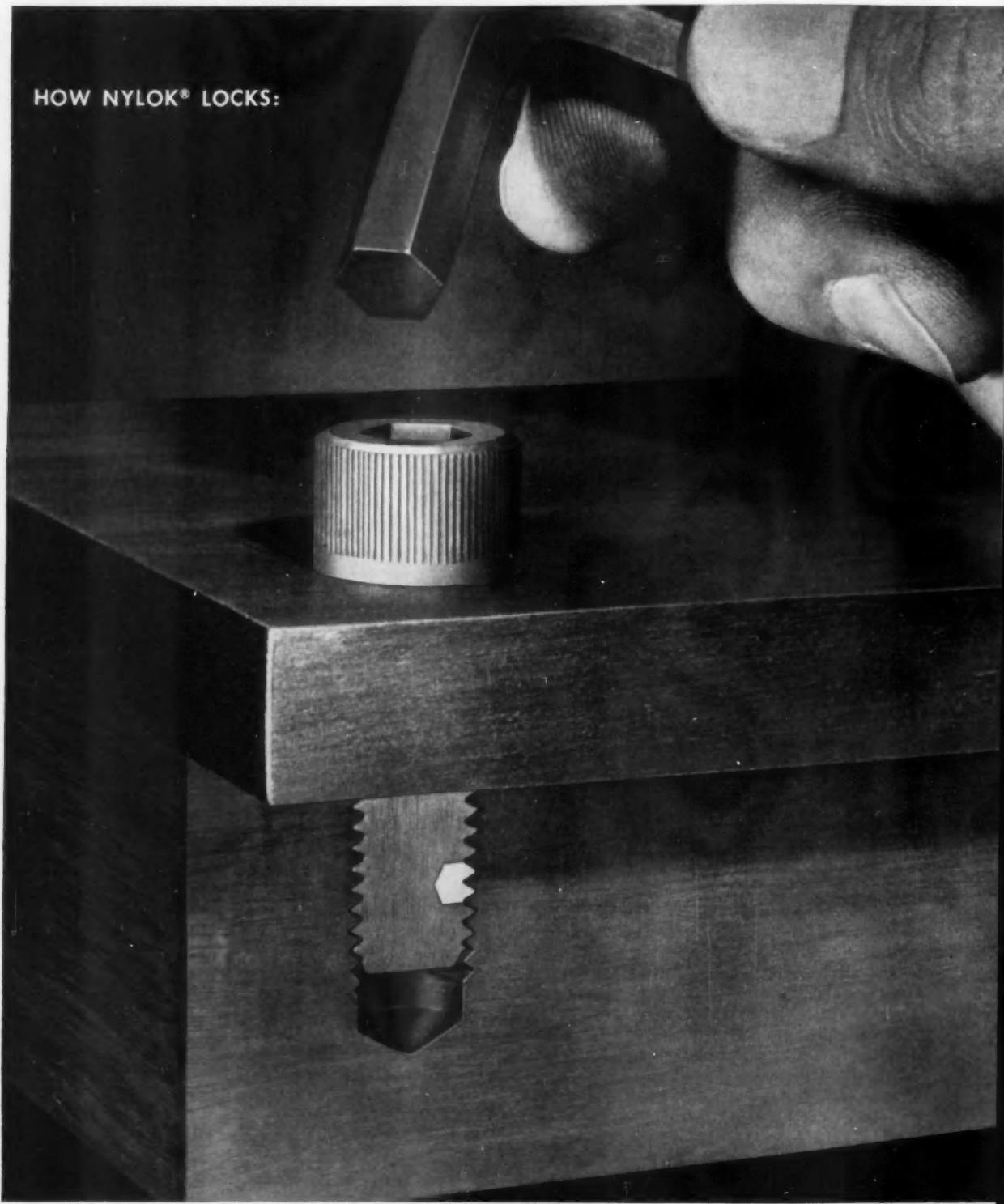


You can have the benefit of Uni-Tork  
on your present Thor Screwdrivers  
and Nutsetters. Ask for full details.

Atlanta • Birmingham  
Boston • Buffalo  
Chicago • Cincinnati  
Cleveland • Denver  
Detroit • Houston  
Kansas City, Mo. • Los Angeles  
Milwaukee • Newark  
Long Island City, N.Y. • Philadelphia  
Pittsburgh • St. Louis  
San Francisco • Seattle  
Toronto, Canada  
Export Division, New York City

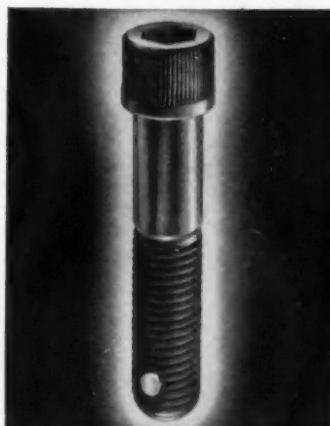
# NEW—self-locking UNBRAKO

HOW NYLOK® LOCKS:

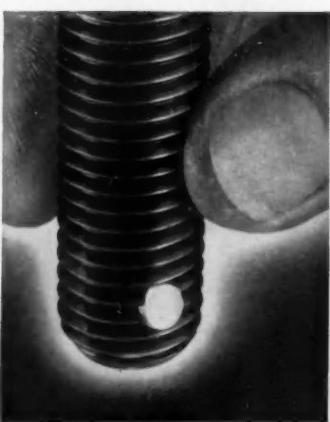


**LOCKED!** The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

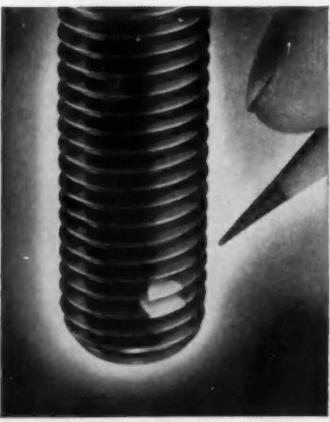
# socket head cap screws



Self-locking UNBRAKO socket head cap screw.



BEFORE ASSEMBLY. The nylon pellet projects slightly. When assembled, threads will be impressed into it.



AFTER REMOVAL. "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

**They won't work loose. And they simplify design and save production time.**

UNBRAKO socket head cap screws are now available embodying the Nylok\* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOS are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from  $-70^{\circ}$  to  $250^{\circ}\text{F}$ . And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 53, Pa.

\*T.M. Reg. U.S. Pat. Off., The Nylok Corporation

**UNBRAKO SOCKET SCREW DIVISION**

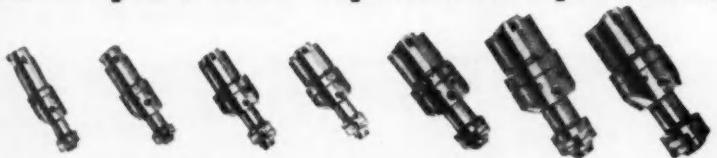
**STANDARD PRESSED STEEL CO.**

**SPS**

JENKINTOWN PENNSYLVANIA

how leading  
car, truck  
and trailer  
builders  
solve  
production  
riveting  
problems  
with  
Hannifin  
“HY-POWER”  
Hydraulics

**1 They select the correct size  
“Hy-Power” Hydraulic Cylinders**



Hannifin supplies "Hy-Power" Hydraulic Cylinders in 7½ to 100-ton capacities (more in multiple) to exert the force exactly when and where you want it.

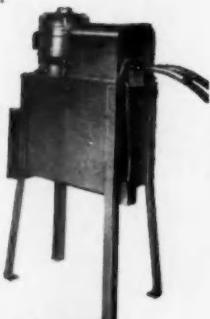
**2 They mount the cylinders in  
Hannifin "C"-Frames**



The "Hy-Power" line includes standard "C"-frames in a wide variety of sizes and types for portable or stationary use. Or, if your requirements are special, Hannifin will design and build "C"-frames to suit your needs.

**3 Power source is the  
exclusive "Hy-Power"  
Pressure Generator**

Here's Hannifin's patented, noiseless pressure generator. It's a compact unit that combines motor, pump, oil reservoir, control valves and high-pressure intensifier.



**HANNIFIN "HY-POWER" RIVETING  
IS THE LONG-TIME STANDARD OF  
THE AUTOMOTIVE INDUSTRY**

If you're looking for a better riveting method—whether you need one riveter or fifty—discuss it with your Hannifin representative. Meanwhile, get the full story by writing for Bulletin 150.



# HANNIFIN

Air and Hydraulics Cylinders

Hannifin Corporation, 543 S. Wolf Rd., Des Plaines, Ill.  
• Hydraulic Presses • Pneumatic Presses • "Hy-Power" Hydraulics • Air Control Valves



KING-SEELEY

Automotive Instrumentation



Capably Engineered  
Distinctively Styled  
Quality Controlled



KING-SEELEY CORPORATION  
ANN ARBOR, MICHIGAN



# PROGRESSIVE-GRAM

ANCO | OHIO | DP17 | PHILLIPS | HOLLOW

DP 17 TO FASTENER BUYERS EVERYWHERE = TORRINGTON CONN=

-NOW FROM PROGRESSIVE-

CUSTOMIZED SERVICE ON PHILLIPS HEAD SCREWS =

=LARGEST MANUFACTURER TORRINGTON, CONNECTICUT

-DIAMOND TIGHT-IT

-YDER TENSION HEAD

LARGEST MANUFACTURER

HIGHBRIGHT TORSION HEAD

PRECISION HEAD

-YDER TENSION HEAD



Now you can get from PROGRESSIVE Phillips Head Screws with an extra customized touch — Phillips Head Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; plus (3) the double economy of low initial cost and the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

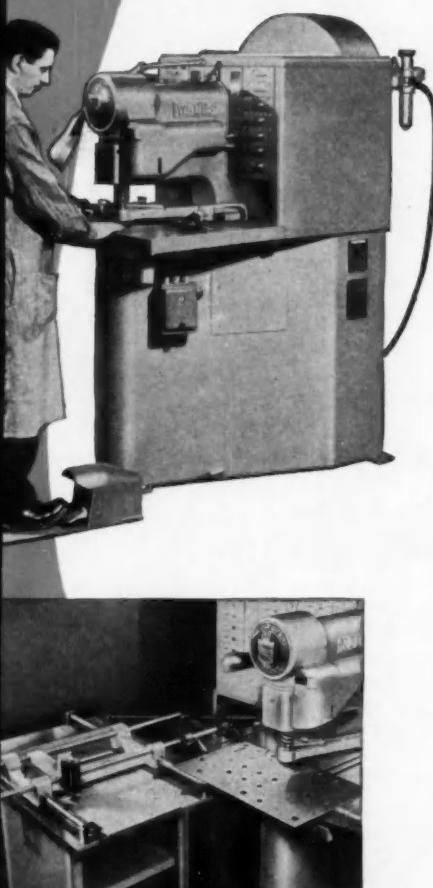
**THE PROGRESSIVE MFG. CO.**

Division of The Torrington Company  
72 Norwood Street, Torrington, Connecticut

**"WALES-WAY" showed us how to  
SPEED-UP hole punching  
OVER 50% ...**

with the

## WALES FABRICATOR



Here's a big money maker in any sheet metal shop. Punches and dies for round and shaped holes take only seconds to remove and replace. Complete sets are always ready in handy cabinet. For holes up to  $3\frac{1}{2}$ " diameter the "WALES-WAY" quick change method saves plenty of time on your job. The WALES FABRICATOR is the PRACTICAL single-hole punching equipment with plenty of reserve power for punching up to  $\frac{1}{4}$ " plate.

Immediate deliveries, and you may pay for this equipment out of profits if you wish. Let us tell you about this plan.

### The NEW positive DUPLICATOR

This husky WALES DUPLICATOR increases the scope of your WALES FABRICATOR to make production runs both practical and profitable. It permits positive duplication of unlimited hole patterns from master templets to jig borer tolerances. The templet is secured in steel work table T slots of DUPLICATOR. Cam action clamps position work piece. Holes are located quickly and easily by a stylus type locator pin. Press gently and the hole is duplicated EXACTLY on the work piece. The WALES positive DUPLICATOR does a terrific job. Any man in your shop can handle it perfectly in a few minutes.

#### Send For Bulletin No. 17-H

Get the complete story of the WALES Sheet Metal FABRICATOR with proof of performance. The facts about the positive DUPLICATOR are included. This is the type of equipment that merits your consideration NOW.



See the NEW  
WALES MOBILE  
FIELD UNIT



Outfitted with Fabricator, Duplicator, Tooling and equipment to show you, right at your door, the money making potential of the "WALES-WAY". Let us arrange for the Field Unit to visit YOU.

**WALES Strippit COMPANY**

"...the Wales-Way is the PLUS-PROFIT way"

345 PAYNE AVE. — North Tonawanda, N.Y.

WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONT.

# STAINLESS STEEL TRAILER weighs less than Aluminum Trailer of equal capacity



*Stainless RIGID-tex Metal Pattern 5-WL  
Actual Size*

The trailer shown is thirty-five feet long by eight feet wide, with a volume of 2100 cubic feet. It is of the frameless type, i.e. it has no under frame or supporting beams. The skin carries the load. The high-strength, low-weight ratio of stainless RIGID-tex Metal made possible the use of 26 gauge thickness for the side wall panels. Result: more payload capacity and lower dead-heading costs.

In addition to strength and low weight RIGID-tex Metal produces an outside trailer surface that is mar-resistant. Scratches and scrapes from tree

branches and flying stones are concealed. Objectionable reflections of sunlight with resultant glare are eliminated by the RIGID-tex pattern. The outer trailer surface, barring collision, will maintain its original beauty for the life of the vehicle.

RIGID-tex Metal is also produced in aluminum, titanium, in fact any metal . . . any finish . . . any color, solid or perforated. There are more than 40 standard patterns from which to choose and new patterns are always in process of development.

For permanent beauty, strength and light weight always specify RIGID-tex Metal.

*See Sweet's Design File 1a/Ri or write us for complete information.*

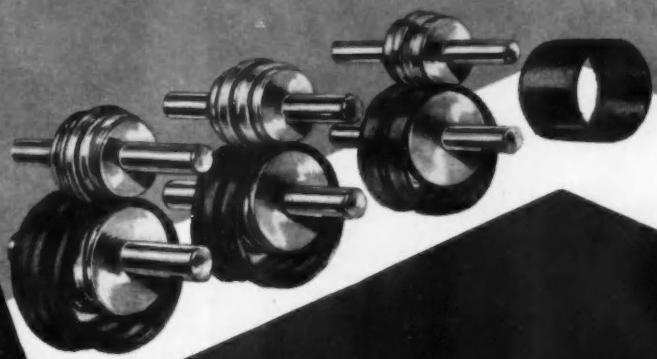


**RIGIDIZED METALS CORPORATION**

6719 OHIO STREET

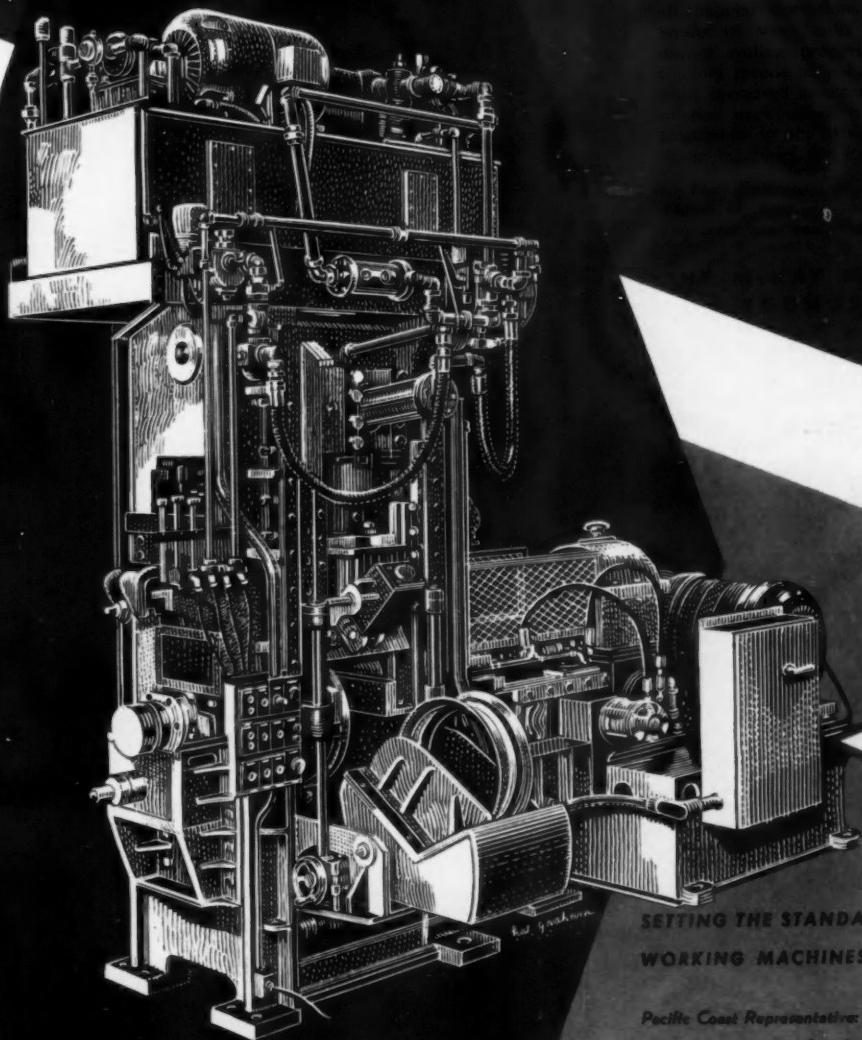
BUFFALO 2, N.Y.

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES



MCKEEY'S

## Automatic Rim Roller Line...



SETTING THE STANDARDS OF QUALITY IN METAL  
WORKING MACHINES FOR TWO GENERATIONS

Pacific Coast Representative: ENGEN INDUSTRIAL COMPANY  
Los Angeles, California



**How would you jig and set up to perform nine operations on these three holes simultaneously in 5.11 seconds for 82/100¢ per part?**

At first glance it looks like a cinch! . . . just use three drilling units with combination tools!

But each hole must also be reamed, and the part has no fixed locating point for a second chucking . . .

## "Operations Kingsbury" maintains high

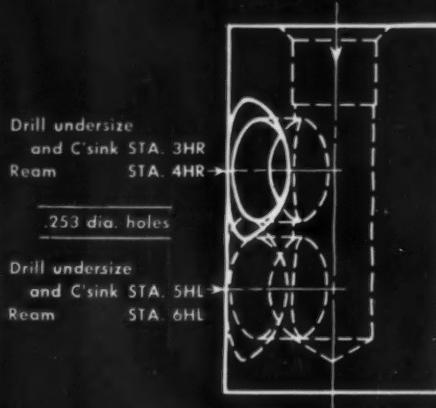
### STEEL BAR

Eight Operations from three directions  
700 parts per hour gross  $\frac{82}{100}$ ¢ per part



#### .190/.209 dias. hole

STA. 1V: Drill 1/2 depth  
STA. 2V: Drill full depth  
STA. 6V: Chamfer 1/32 x 45.  
STA. 7V: Comb. Ream

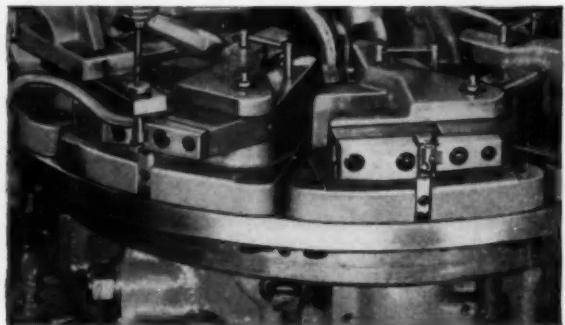


The part is a steel cylinder  $\frac{1}{2}$  inch diameter and  $1\frac{9}{16}$  inch long. Vertical hole is along the axis. Horizontal holes are located on two levels,  $67^\circ$  apart.

Manually-operated work-holding fixtures are designed to hold the part with the axis vertical. It is seated firmly against locators at the bottom, back and left-hand side, and clamped from the right. All operations are performed without removing the part from the fixture.

Six Kingsbury units are mounted on a 60-inch base. Eight work-holding fixtures are mounted on a  $20\frac{1}{2}$ -inch table, which indexes through eight stations, one used for loading and unloading.

At Stas. 1 and 2 a vertical unit is equipped with a two-spindle auxiliary head. At Sta. 1-V, one spindle drills the .190 dia. axial hole undersize to half depth. A bushing guides the drill. At Sta. 2-V the second spindle drills the hole to full depth. This two-stage operation



Eight precision-built fixtures accurately mounted on the Kingsbury dial assure perfect interchangeability.

is necessary in order to complete this work within the required time period.

At Sta. 3-HR a horizontal unit with combination tool drills the upper (right hand) .253 dia. hole undersize to connect with the axial hole. It also forms the counter-sink. A similar unit at Sta. 4-HR reams this hole. Bushings guide the tools.

Identical operations are performed on the lower (left hand) hole at Stas. 5-HL and 6-HL.

At Stas. 6 and 7, a vertical unit is equipped with a two-spindle auxiliary head. Spindle at Sta. 6-V chamfers the axial hole  $\frac{1}{32} \times 45^\circ$ . Spindle at Sta. 7-V

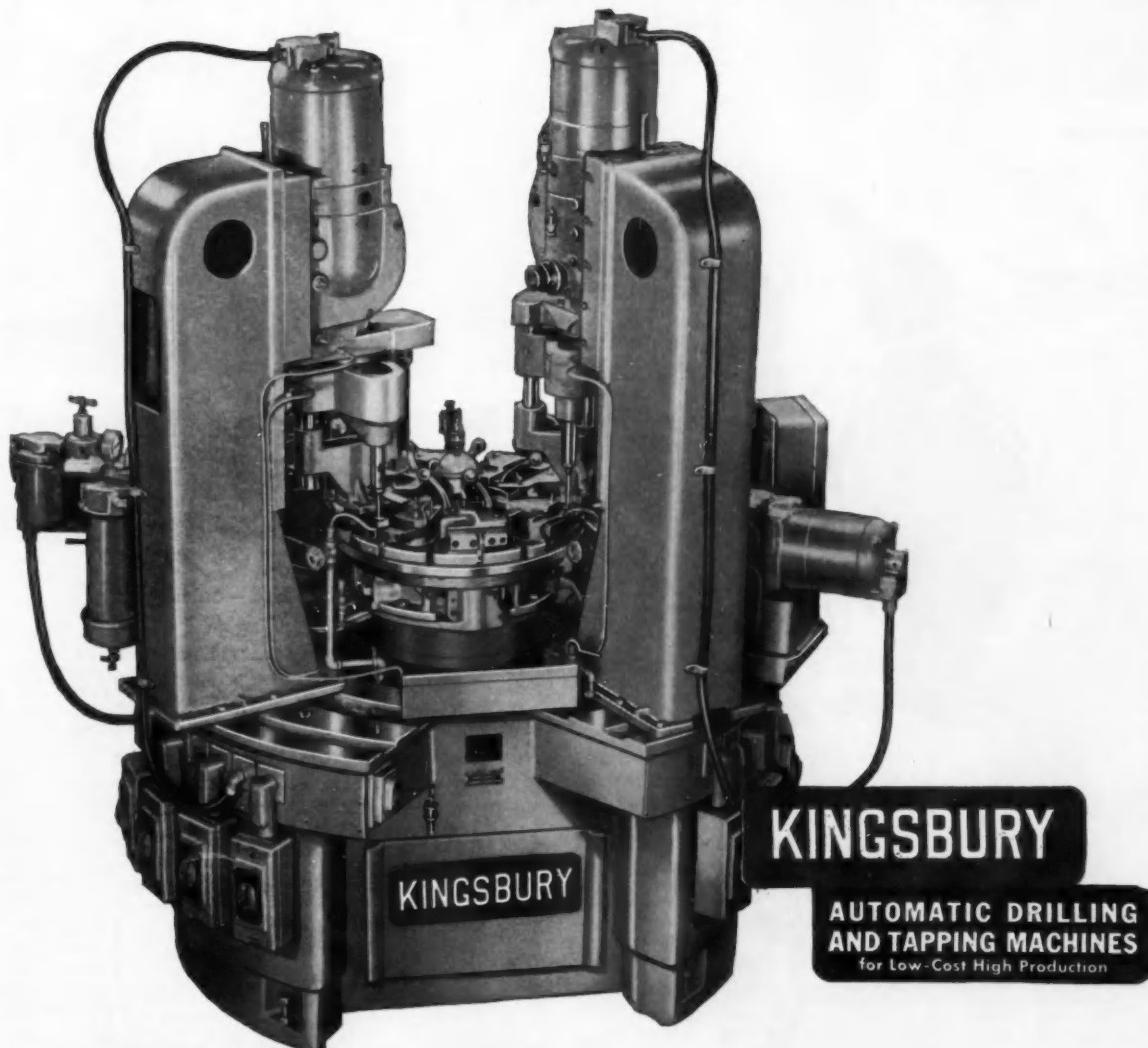
combination step-reams the hole to .190/.209 diameters, removing the burrs from the break-through of the two horizontal holes.

\* \* \*

Going back to our first premise: it's a cinch — *on a Kingsbury*. But what makes it a cinch? Specially designed work-holding fixtures that are uniformly accurate. Kingsbury heads, bases, indexing tables, electrical controls — all working together in perfect automation — plus the experience and skill of our engineers who are always looking for better ways to make better Kingsburys. Let us show you!

Kingsbury Machine Tool Corp.  
118 Laurel St., Keene, N. H.

## production of interchangeable parts at low cost





"Bet a fish it's got **SKF** bearings!"

Don't take that bet, bird — unless you have fish to burn!

**SKF** is the company that sells *all four* basic types of bearings. And that means you'll find our bearings in more applications...in more places in the world...than any other bearings. In everything from roller skates to roaring jets, these bearings literally make the world go round. *Plus-quality* **SKF** Bearings are serving your industry, your family and you right now! 7720

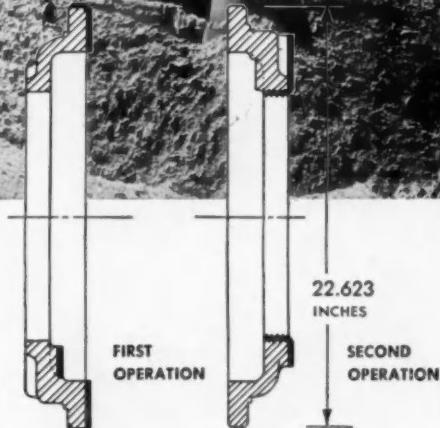
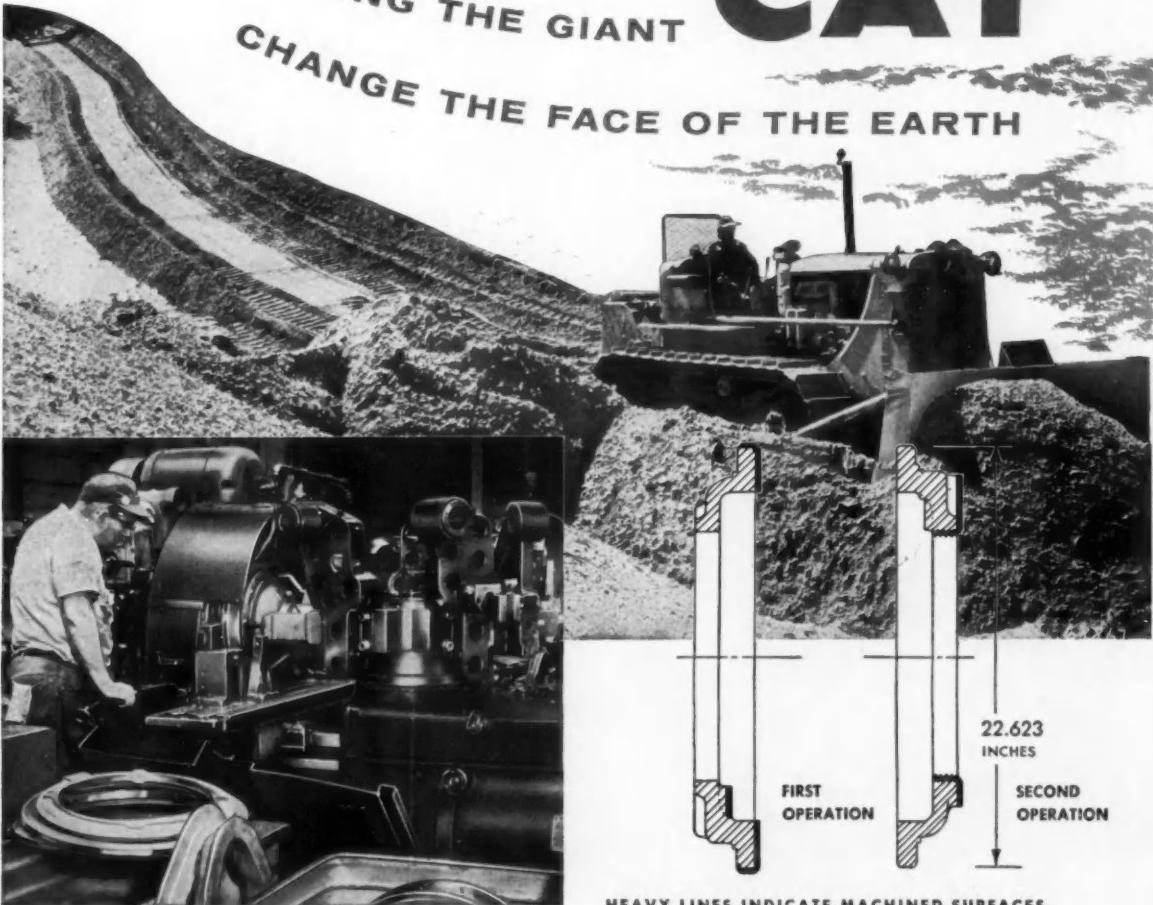


**SKF**

- Ball Bearings
- Cylindrical Roller Bearings
- Spherical Roller Bearings
- Tapered Roller Bearings ("Typon")

\*Reg. U.S. Pat. Off. Tyson Bearing Corporation  
**SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.**

HELPING THE GIANT **CAT**\*  
CHANGE THE FACE OF THE EARTH



HEAVY LINES INDICATE MACHINED SURFACES

## The POTTER & JOHNSTON 6-DRE-40 Automatic

**Chucking Turret Lathe Produces BIG parts like this  
QUICKLY, ACCURATELY and ECONOMICALLY**

Virtually "changing the face of the earth" is a rough, tough job that takes rugged, built-for-the-purpose equipment like the famous CATERPILLAR Tractors. And turning out component parts for these mighty marvels is a tough job too . . . one that calls for the rugged power, extra rigidity and all-round versatility of a machine like the POTTER & JOHNSTON 6-DRE-40 Automatic Chucking Turret Lathe.

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

If you have difficult machining jobs — and who hasn't in these days when complex parts must be produced fast — why not borrow a page from the CATERPILLAR success story. Depend on a POTTER & JOHNSTON AUTOMATIC. Get started today . . . write for full information on the P&J 6-DRE-40 and on the other Automatic Chucking Turret Lathes in the complete P&J line.



Bulletin No. 159

*Precision Production Tooling for more than Fifty Years*

## POTTER & JOHNSTON COMPANY

PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INCORPORATED

P & W BRANCH OFFICES: Birmingham • Boston • Chicago • Cincinnati • Cleveland • Detroit • Los Angeles • New York • Philadelphia • Pittsburgh • Rochester  
San Francisco • St. Louis EXPORT DEPT: Pawtucket, Rhode Island AGENTS: Dallas, Southwest Industrial Sales Co. • Houston, Wessendorf, Neims & Co.

MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT



# Tourek

BALL JOINTS  
The Recognized "STANDARD"

**TOUREK BALL  
JOINT LINKAGES  
CAN BE SPECIALLY  
DESIGNED FOR  
YOUR NEEDS!**

Whatever length or style of Special Linkages you need, capable TOUREK Engineers will develop the ONE best and most economical design for your specific needs. They can be supplied spring loaded or plain . . . male or female . . . straight or bent . . . plated or not . . . solid or tubular.

During 36 years of specializing, we've developed thousands of types for various applications. Critical customers have always depended upon us for UNIFORM

fine quality and the ACCURACY they need to assure top performance and long life. TOUREK also assures you of dependable service . . . all work is conscientiously scheduled . . . and delivery made "on-time" to meet production requirements.

Although the best in Ball Joints is an outstanding TOUREK specialty we also produce SCREW MACHINE PRODUCTS of every description, in large volume. Write for complete information today!

**J. J. TOUREK MFG. CO.**

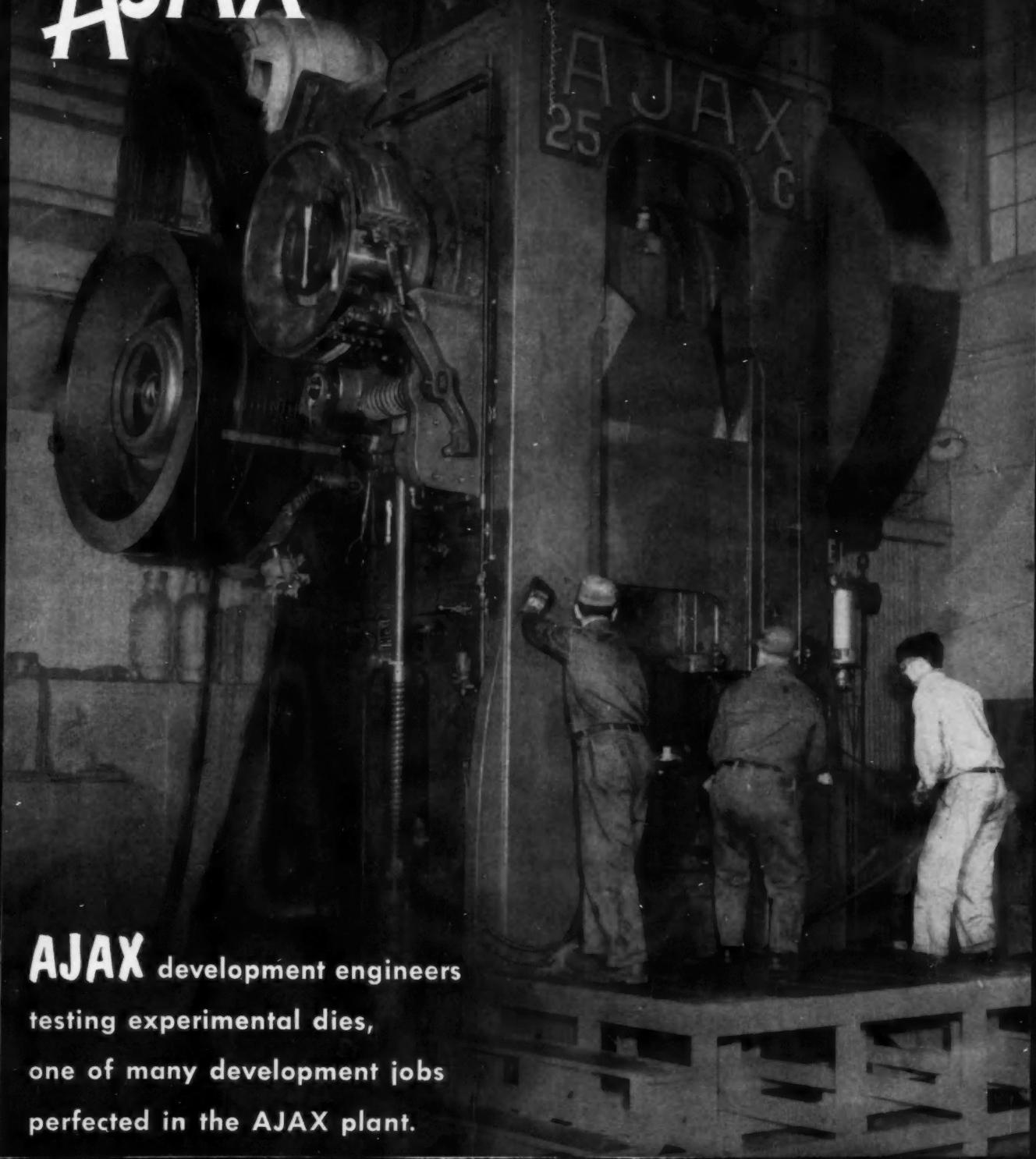
ESTABLISHED 1920

1901 SOUTH KILBOURN AVENUE, CHICAGO 23, ILLINOIS

UP TO 2-5/8" DIAMETER SINGLE AND MULTIPLE SPINDLE MACHINES . . . THREADING • TAPPING •  
MILLING • DRILLING • GRINDING • POLISHING • PLATING • HEAT TREATING • SILVER SOLDERING •

WORLD'S LARGEST MANUFACTURER OF "STANDARD" BALL JOINTS

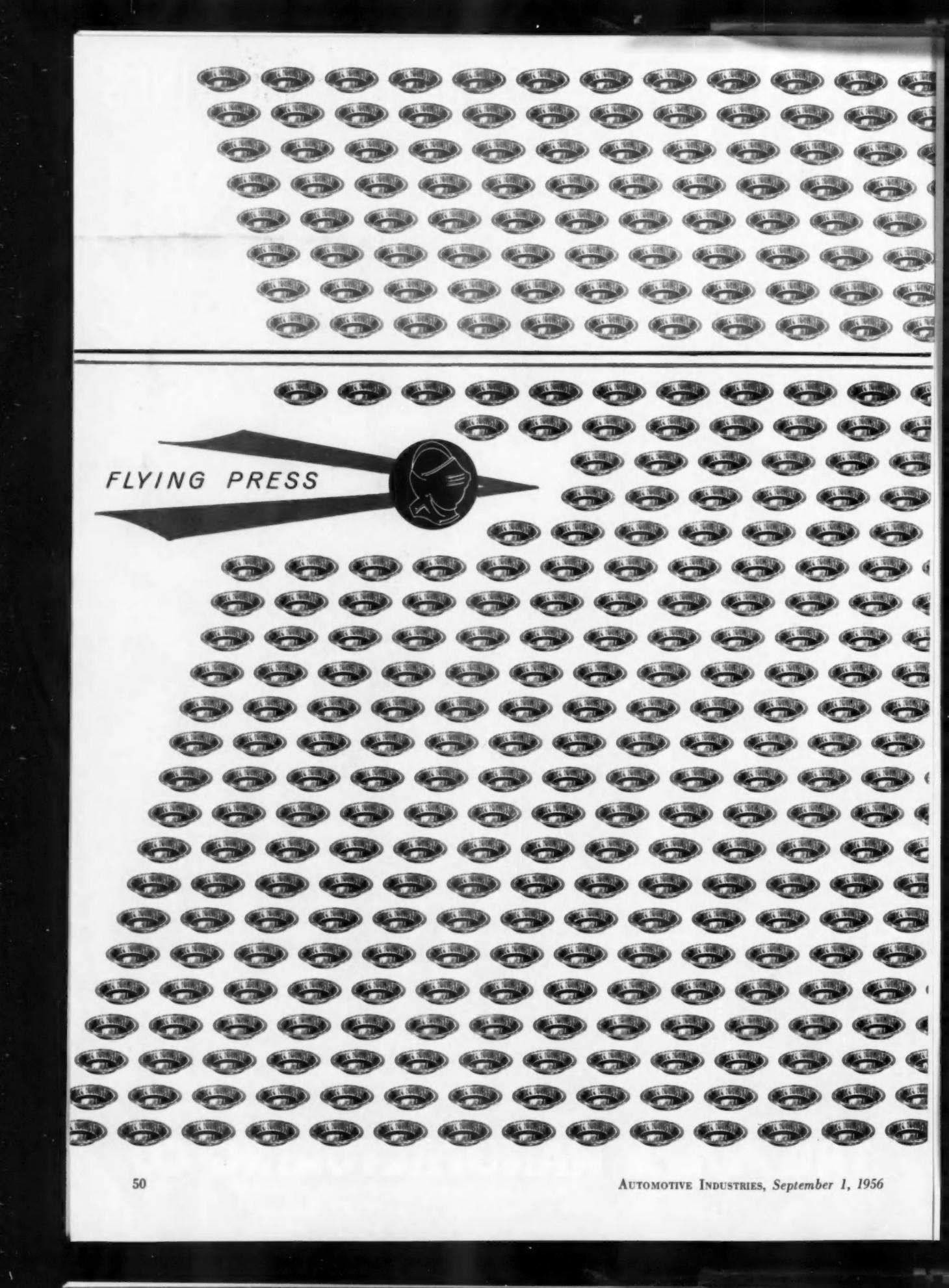
# AJAX PRESSES FOR FINE FORGINGS



AJAX development engineers  
testing experimental dies,  
one of many development jobs  
perfected in the AJAX plant.

**THE *Ajax* MANUFACTURING CO.**

EUCLID BRANCH P. O. CLEVELAND 17, OHIO  
110 S. DEARBORN ST., CHICAGO 3, ILLINOIS  
W. P. WOOLDRIDGE CO. • BURLINGAME, CAL. • LOS ANGELES 22, CAL.



**FLYING PRESS**





# Just 1 Minute!

**You are looking at 60 seconds worth  
of Wean Flying Press production**

Over 400 aluminum pie plates, of .002 gage strip, in just one minute! During a demonstration run of the "Flying Press" in the Wean Testing Laboratory, another "conventional press" record fell by the wayside — this time the products were four-inch diameter pie plates, of hard-to-handle .002 gage aluminum strip. The Wean "Flying Press," fitted with the same dies used on the old-type press, nearly quadrupled the normal production limit of 110 per minute.

This bit of magic wasn't done by mirrors — it was the result of an entirely new type of industrial press. The revolutionary Wean "Flying Press" features a continuous-feed design that allows for much greater speed and increased accuracy. It eliminates the clutch and brake which are integral parts of the old intermittent feed presses, and hence reduces press maintenance costs which center largely in these areas.

If you are performing a blanking, piercing, notching or shallow draw operation on either light or heavy gage strip, you can't afford to ignore this revolutionary new press. The first step to adding the Midas touch to your balance sheet is to make an appointment for a demonstration of the Wean "Flying Press." Write today — Wean Equipment Corporation, 22800 Lakeland Boulevard, Cleveland 17, Ohio.

On this page are pictured over 400 aluminum pie plates. Those printed in red indicate one minute's production made on conventional equipment. Those in black are the "bonus" the Wean "Flying Press" can provide. A production increase of nearly 300%.

**Wean**  
**EQUIPMENT CORPORATION**

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## THE CASE FOR POWER STEERING ON TRUCKS!

The trend to power steering on trucks is based on one very practical reason—operators of trucks equipped with power steering have invariably found that the added safety and greater operating efficiency of their vehicles have demonstrated that power steering is indeed a sound investment.

Truck drivers using power steering report less tension and fatigue in normal driving and appreciate the positive control that blocks road shock from chuck holes and prevents loss of control if the truck is forced out on a soft shoulder.

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In short, power steering, by saving time and money, contributes materially to a more profitable operation.

Truck manufacturers are always eager to offer their customers features

that will make truck operation safer and more profitable and, at the same time, give their dealers every selling advantage.

That's why more and more truck manufacturers are offering performance-proven Bendix Power Steering as original factory equipment.

If you would like to know why power steering for trucks is perhaps even more logical than power steering for passenger cars, we have prepared an interesting folder on the subject.

Write for your copy today. We think you'll be convinced.

Bendix PRODUCTS DIVISION South Bend IND.



# AUTOMOTIVE INDUSTRIES

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## High Spots of This Issue

SINCE the Machine Tool and Production Engineering shows were held one year ago in Chicago, many major advances have been made in machine tools and production equipment. This progress was recorded on the pages of AUTOMOTIVE INDUSTRIES and the volume of new equipment was quite large considering that the manufacturers went all-out at the Chicago shows. Among this new equipment have been numerous ingenious machines.

Most of the outstanding equipment announced during the past 12 months is described and illustrated in this annual reference issue. Because of the emphasis on increasing productivity, production engineers, purchasing executives and company officials participating in the selection of equipment will find it a useful volume for their planning.

For the convenience of the reader, equipment is presented in seven classifications—Machine Tools, Forming Equipment, Processing Equipment, Material Handling Equipment, Quality Control, Welding Equipment and Specialized Equipment. The last category includes die casting, injection molding, controls, components and others.

The modern trend in machines continues as indicated by the equipment described in this issue. More and more automatic and semi-automatic operations, controls, loading and unloading mechanisms are being incorporated in machinery. Automatic inspection devices are being developed for closer and closer tolerances where necessary. More machines have been developed to take full advantage of the continuing advances in cutting materials. Ease of operation and maintenance for reducing worker fatigue is another feature.

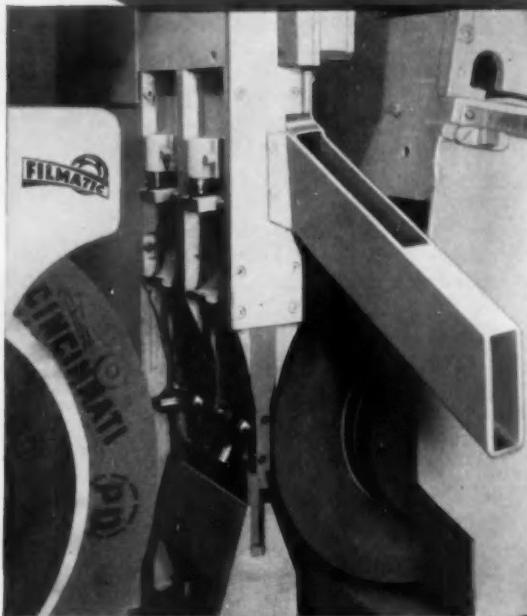
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### AUTOMOTIVE INDUSTRIES COVERS

PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES  
• BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY  
PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT  
SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT  
ENGINEERING • PRODUCTION • MANAGEMENT

# Unique Transfer Idea Solved This Problem:

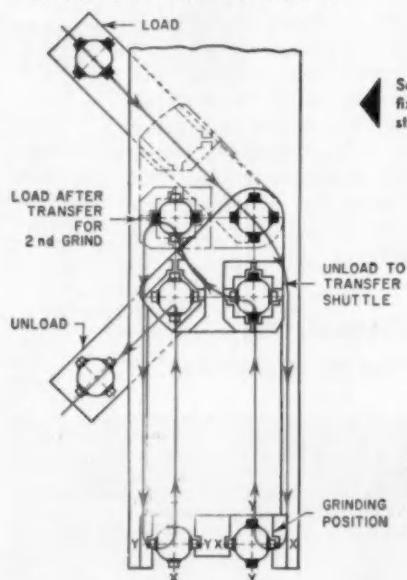
**Automatically Grind Four Diameters  
of Universal Joint Spiders in One Cycle**



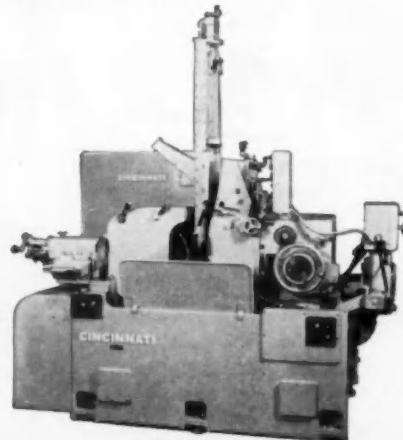
Two universal joint spiders are in process at the same time, grinding two pin diameters on each of two parts. Estimated production, 300 completed parts per hour.

Everyone familiar with universal joint spiders will agree that it's a neat trick to automatically grind the two pin diameters on each of two parts at the same time. Cincinnati automation specialists devised a way to do the job on a new CINCINNATI® FILMATIC No. 2 Centerless Grinder. A unique transfer mechanism, incorporated in the loading fixture developed by Cincinnati for the machine, was the key to this low-cost method of production. Principle of operation is diagramed below at the left. ¶ The manufacture of universal joint spiders may not be your line of work, but some type of precision cylindrical grinding is required in your shop, and Cincinnati grinding and automation specialists can help you do a better job at lower cost. You can be sure that these men will give you the benefit of the most advanced thinking in centerless grinding methods, backed up by 33 years' experience. May we hear from you?

**CINCINNATI GRINDERS INCORPORATED  
CINCINNATI 9, OHIO**



**CINCINNATI FILMATIC No. 2**  
Centerless Grinder, equipped to automatically grind universal joint spiders. You will find brief information on the standard No. 2 machine in Sweet's Machine Tool File. For complete data, write for catalog No. G-644-1.



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# News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 115, No. 5

September 1, 1956

## Ford Borrows \$250 Million For Future Expansion Plans

Earlier speculation that Ford would seek additional capital to help finance its continuing expansion program was confirmed last month (August) with the announcement that the company has made arrangements with a group of insurance companies and banks to borrow \$250 million.

The company did not indicate whether its new line of "E" cars, scheduled for introduction late next year, is included in the new expenditure plans. However, last April Ford revealed that costs for developing the new line of cars would run in the neighborhood of \$250 million.

In a revised progress report issued by the company just prior to the loan announcement, Ford said that new plant and modernization costs from Jan. 1, 1946, through the first half of 1956 amounted to \$1.89 billion. The company's expansion program since the end of World War II will have cost more than \$3.8 billion when currently planned projects are completed.

The total includes more than \$2 billion for plants and more than \$1 billion for special tools. Included are tools for new car model changeover programs.

Under future plans, Ford will spend \$935 million for additional plants, office buildings and service facilities, including \$383 million to be spent in the second half of this year, \$375 million in 1957, and \$177 million in 1958 and 1959.

## Perfect Circle Schedules New Distribution Center

A \$1 million distribution center for packaging, storage and control of finished products will be constructed by Perfect Circle Corp. in Hagerstown, Ind. The new plant will house



## HUGE HOPPER TRAILER AND TRACTOR COMBINATION

This gigantic bottom-dump trailer, drawn by a Kenworth 803 tractor with a 400-hp Cummins V-12 Diesel engine, is destined to go to work soon in the coal fields of West Virginia. Designed and built by Marion Metal Products Co., the trailer is 47 ft. 4 in. long, 12 ft wide, and 13 ft. 6 in. high. Rated at 95 cu yd capacity at struck (water) level, the trailer will actually carry well over 100 cu yd when heaped. Empty, the trailer weighs 47,700 lb, while the tractor weighs 50,920 lb, a total empty weight of 98,620 lb. The unit will be over 119 tons with a coal load.

activities now located in the company's main plant in that city, which will be expanded for office and manufacturing facilities.

## Square D Sales, Profits Rise In Six-Month Period

The high rate of industrial expansion this year has reflected noticeably in financial reports of companies which supply the equipment and machinery for new plants. Square D Co., manufacturer of electrical systems for industrial and commercial applications, reports that its sales for the six months ended June 30 amounted to \$48.4 million compared with \$34 million in the similar period last year. Profits rose substantially, totaling \$5.2 million compared with \$2.9 million in 1955. The financial report included sales and profits of Electric Controller and Manufacturing Co., which Square D acquired at the end of last year and has been operating as a division.

## Two New Frame Constructions Set to Appear on 1957 Cars

At least two interesting types of automobile frame construction will appear on 1957 models. One is an X-type which permits a lower floor.

The other is what is known as "cruciform" and consists of a short heavy center rail with two members running out in a vee from each end.

## Firestone to Make Army's Newest Anti-Tank Weapon

Firestone Tire & Rubber Co. will produce the Army's new 106 mm recoilless anti-tank rifle under a \$2.3 million contract it has received from the Cleveland Ordnance District. Other contracts for the rifle also are expected to be forthcoming.

Firestone has been doing research on the rifles for the Army and previously built several of them for testing. The rifle has no specific name, but at one time it was known as the BAT, or "battalion anti-tank."

# News of the AUTOMOTIVE



## FIAT STATION WAGON CHASSIS FOR SPECIAL USES

Pinin Farina of Turin has evolved a new body style for the Fiat 600 Multipla diminutive station wagon chassis. An open pleasure vehicle, it seats two passengers on the main seat and another six persons on a wooden mahogany bench in the middle area. Boat-type lines and a wrap-around windshield are features of the rear-engined car.

### Double-Purpose Cargo Trailer Developed by American Motors

The Special Products Div. of American Motors Corp. has developed a new double-purpose cargo trailer. An unusual feature of the four-wheeled unit is a completely retractable hydraulic wheel mechanism.

In addition to functioning as a conventional-wheeled vehicle, the trailer can operate as a sled over ice and snow. The retractable wheel feature also conserves cargo space within a transporting airplane.

The prototype vehicle is one of a family of six, with cargo capacities ranging from 500 to 10,000 lb.

### White Sales, Net Hit All-time High

White Motor Co. continues to look forward to a healthy market for the remainder of 1956, in light of a steady upward demand for heavy duty trucks and new activity which is now getting underway on the country's Federal highway-building program.

One of the few major truck companies to produce more trucks so far this year than in 1955, White realized record sales and earnings for the first six months. Sales soared to \$112.5 million from \$85.1 million last

year, while income climbed to \$3.5 million from \$2.9 million. Total sales for 1956 are expected to top \$200 million.

White produced more than 10,000 trucks between January and the end of July, nearly 2000 units more than in the like period last year. White's new "9000" series of truck tractors, introduced last year, are accounting for 25 per cent of the total truck orders received by the company.

### Car Inventories Further Reduced As Makers Change To '57 Output

Inventories of new cars last month dropped to the lowest point this year, and substantially under the similar period in 1955, reflecting the lower production schedules during the past several weeks. With output on 1956 models now phased out at several companies, and with other makers in the midst of changeovers for 1957 cars, stocks will be further trimmed.

Inventories at the beginning of August stood at below 650,000 units, and were expected to drop another 50,000 by month's end. This would be about a one-third reduction from the record 900,000 units at the beginning of the year.

Because many dealers have been conservative in ordering cars from

the factory during the past couple of months in view of lagging sales, some may be caught short-handed. However, 1957 models will start rolling off production lines, and next month should see a pickup in sales as the first of the new models start going on display in showrooms. First 1957 models will make their debuts the first week of October.

Earlier forecasts that production in the third quarter would total in the neighborhood of one million units are holding up. Output at mid-point of the third quarter stood at around 600,000 cars. With Chrysler and Ford resuming production this month, total output for the third quarter may go slightly over the one million mark. This would bring total car production for the first three quarters to over four million units. The industry is confident that a sales upswing in the last quarter will bring the September-December output total to at least two million, for a year's grand total of more than six million cars.

### Large Chevrolet Warehouse Starts Rising Near Flint

A one million sq ft parts and accessories supply depot, the largest in the company's warehousing network, is being constructed by Chevrolet near Flint, Mich. When completed next summer, the one-story facility will be the controlling point for inventory distribution to the more than 40 Chevrolet warehouses around the country. The new building will house operations now located at the Flint manufacturing plant, which will be maintained as a factory warehouse.

Some 1500 persons will be employed in the new warehouse, including approximately 900 who will be transferred from the former facility. The building also will house the Flint zone sales office.

An extensive conveyor system will be installed in the warehouse to handle the vast array of parts and accessories, including a tow-type that draws four-wheel cars for transporting stock. Priming equipment for spare parts will have a capacity equivalent to the company's largest assembly plant.

# AND AVIATION INDUSTRIES

## Chrysler Optimistic About New Car Sales During 1957

How many cars the automobile industry will be able to sell next year is anybody's guess, but many observers believe it should be another good year. L. L. Colbert, president of Chrysler Corp., predicts that there will be an upturn in car sales next year over 1956.

To support his optimism, Colbert cites a recent survey by the Univ. of Michigan which indicates that consumers are as optimistic or more optimistic about general business conditions than at any time in the last three years and that an "unusually large" number expect to buy 1957 model cars. Many of the 18 million persons who have bought new cars in the last three years will be potential customers for the 1957 models, Mr. Colbert noted.

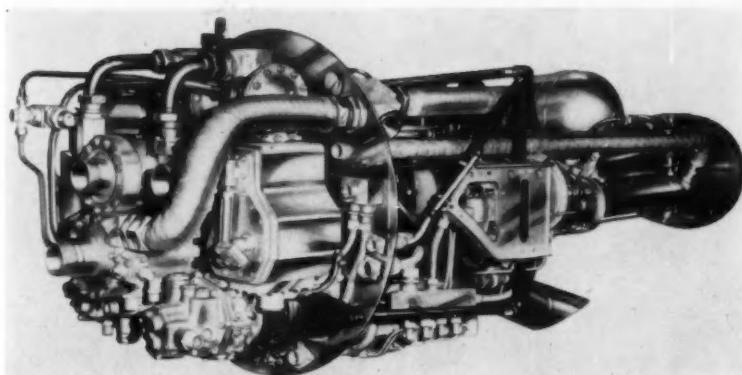
Chrysler itself is applying increasing emphasis on selling its low-priced Plymouth, with the hopes of lifting that division back to third place in industry sales, now held by Buick. The Plymouth will be the "spearhead" of the company's entire promotional effort.

## Federal Motor Truck Gets Order From Chilean Group

An order for 200 trucks, priced from \$3400 to \$15,000 has been awarded to Napco Industries by the Truck Owners Co-Operative of Santiago, Chile, a truckers association. The Federal Motor Truck Div., formerly headquartered in Detroit and purchased by Napco last year, will produce the trucks at its Minneapolis plant.

## Popularity of Gold Paint On Cars Seen Increasing

Popularity of gold paint on automobiles appears to be increasing. Introduced by many car companies for the first time this year in two-tone combinations, the color appeared on more than 20 per cent of the Dodge cars built at the beginning of July compared with only 6.2 per cent in June. The gold hue is usually offered in combination with white.



**SCREAMER ROCKET ENGINES PUSH JETS SKYWARD**

*Built in England by Armstrong-Siddeley, the Screamer rocket engine is rated at 8000 lb thrust and develops up to 9500 lb at 40,000 ft. Weighing 470 lb, it is 78 in. long, 28 in. across, and burns a mixture of liquid oxygen and kerosene. The engine is intended for use with piloted jet aircraft to improve the rate of climb, as well as high-altitude performance, and for take-off assists under many conditions.*

## Packard Leaves Detroit Scene After Half Century

The decision by Curtiss-Wright Corp. to dispose of the Packard Grand Blvd. plant in Detroit came as no surprise to the industry. Curtiss-Wright, seeking to pump new blood into Studebaker-Packard operations, indicated it would attempt to cut costs as much as possible and eliminate any "surplus" facilities to put the company back on a profitable basis. Many of the facilities and equipment at the Grand Blvd. plant have been idle for two or three years, and only part of the plant was used to house some Packard defense operations.

All administrative offices at the five million sq ft facility, which have been housed in the plant for more than 50 years, will be transferred to the Utica, Mich., engineering and transmission plant. Its more modern facility will also be used to produce guided missiles.

The Utica plant was originally built by the Government during the war and has been used by Packard during the past several years for production of V-8 engines. It will now become a main manufacturing center for defense work that Curtiss-Wright is allocating to it.

There was no specific indication at presstime as to what will become of

the Packard assembly plant on Conner Ave. in Detroit, which the company has been leasing from Chrysler. It is being held on a "standby" basis until a decision comes from Curtiss-Wright.

The Utica plant already has received a \$16.5 million defense contract for the production of the Army's new Dart anti-tank guided missile. In addition, another \$36 million order has gone to the South Bend plant for production of 2½-ton trucks for the Army.

Curtiss-Wright expects to pour some \$200 million of defense business annually into the two plants. Both contracts are being carried out by the Utica-Bend Corp., a new subsidiary formed by the aircraft company under the agreement with S-P.

The main question that remains now is whether Curtiss-Wright plans to introduce a 1957 Packard car. It is certain that a face-lifted 1957 Studebaker will be ready.

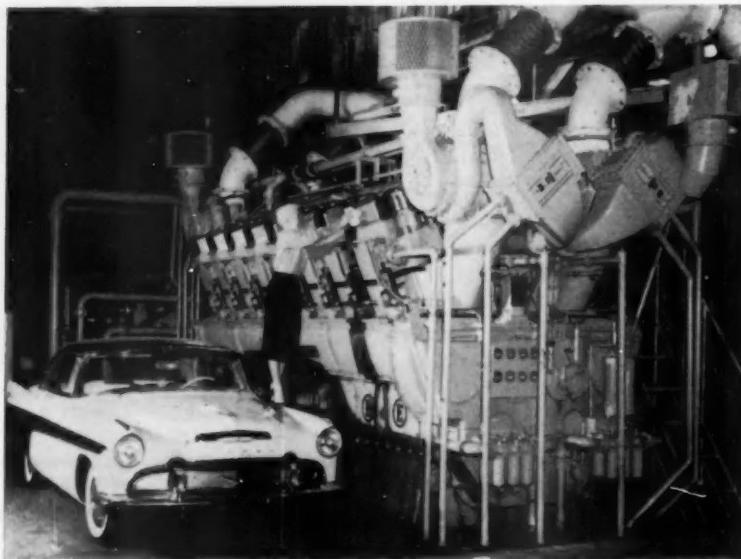
Some sources believe that the Packard name eventually may appear on the Studebaker President model. This theory, if valid, would indicate that one basic body will be used for the two cars, distinguished from one another only by different grille, fenders, and exterior ornamentation.

# News of the AUTOMOTIVE



## BOEING AIR COMPRESSOR FEATURES SIMPLE DESIGN

Illustrated here is the simplicity of a 502-11B gas-turbine-powered centrifugal compressor for a new Boeing compressed air starter unit. Number of output compressor stages were reduced from two to one, and castings in the basic engine were cut from 18 to 7. Oil system and impeller were likewise redesigned for simplicity. Used for starting large jet engines and checking out aircraft pneumatic power and air conditioning systems, the new units are currently in production for the Air Force. They are also available for purchase by operators of jet transports.



## MAMMOTH DIESEL HAS TREMENDOUS OUTPUT FOR SIZE

Seen running on its test stand at the San Francisco, Calif., plant of Enterprise Engine & Machinery Co. is a huge new RV-16 Diesel engine. Equipped with four Brown Boveri VTR 320 turbochargers, the engine weighs approximately 95 tons and is completing dynamometer tests that verify its rating of 7700 bhp at 400 rpm. Pistons of the 16-cyl. V-type giant are 1½ ft in diam. and connecting rods measure four ft in length. Overall length totals 26 ft, 4 in.; height, 12 ft, 1 in., and width 9½ ft. The engine is designed primarily for providing power for main propulsion in ships, driving electric generators in municipal or industrial plants, and for water or oil pumping stations.

## Chrysler Modernizes, Expands Highland Park Piston Foundry

Chrysler Corp. has completed an extensive modernization and expansion program at its Highland Park, Mich., aluminum piston foundry. Aluminum casting equipment of the latest design has been placed in operation to improve product quality and increase the foundry's capacity by 50 per cent.

Up to 75,000 aluminum pistons of a single type can now be produced at the foundry in a 24-hour work day, compared with 52,000 previously. The new expanded facilities will be able to supply 75 per cent of expected piston requirements for Plymouth and Dodge V-8 engines, all of the pistons for Plymouth six-cylinder engines, all of the pistons for the DeSoto and Chrysler V-8 engines as well as all Dodge truck piston requirements.

In the modernization program, 16 automatic casting machines and eight new dry-hearth combination melting and holding furnaces were installed. The new casting machines open and close automatically on a pre-determined timing cycle, with molds and cores held at controlled temperatures by means of a water cooling system. Steel inserts, which are placed upon the cores automatically, control piston expansion and contraction when in the engine. The cast piston is then automatically ejected from the machine onto a conveyor.

Each of the eight new furnaces has 14 sq ft of melting area, and is capable of melting 900 lb of aluminum per hour. The molten metal is then collected in a holding chamber, which holds approximately 3000 pounds of molten metal at pouring temperature.

## Kelsey-Hayes To Build New Facility In East

A new plant for the manufacture of passenger car wheels will be constructed by Kelsey-Hayes Wheel Co. on a site the company purchased at Falsington, Pa. The company did not give any details about the new plant, except to say that it will serve Eastern automotive assembly plants in a number of ways.

# AND AVIATION INDUSTRIES

## AMC Loss for Second Quarter Runs to Total of \$7 Million

American Motors Corp. continues to operate in the red. For the three months ended June 30, the company had a net loss of \$7.04 million, more than double the \$3.3 million net loss in the first quarter. Actual operating loss in the quarter totaled \$10.5 million, more than the two previous quarters combined. The April-June loss compared with a profit of \$1.5 million in the same period last year.

AMC reduced its loss in the latest three months to \$7.04 million by applying a non-recurring profit of \$3.5 million. This was realized from the sale of 216,950 shares of stock it held in Ranco, Inc., a refrigeration and heating control firm which it controlled at one time.

Actual AMC operating loss in the nine months ended June 30 totaled more than \$18 million. This loss was reduced, however, during the period to \$7.8 million by applying a total of \$10.6 million in non-recurring profits to the books—the \$3.5 million from the sale of Ranco stock in the April-June quarter and \$7 million from the sale of stock in the same company during the last three months of 1955.

Sales during the three months ended June 30 amounted to \$93.9 million, 31.5 per cent under the like three months last year. However, for the first nine months of the company's fiscal year, sales were down only 8.1 per cent under the same fiscal period of 1955.

## Construction Work Begins On Ford's Aluminum Plant

Construction has started on Ford's new 200,000 sq ft aluminum castings plant near Sheffield, Ala. Expected to be completed in mid-1957, the new plant will use about 64 million lb of aluminum a year for engine and automatic transmission components and other automotive parts.

Ford will receive the aluminum from a nearby Reynolds Metal Co. plant. Operations at the new plant, to employ about 800 persons, are scheduled to get underway by the end of next year.



**BRITISH BUS WITH PRACTICAL ENGINE PLACEMENT**

The 9 to 12-passenger Austin Omnicar has the engine placed well back from the front of the vehicle to permit the driver to use either side door. The four-cylinder ohv power plant develops 42 bhp at 4000 rpm and is driven through a four-speed unit.

## PLASTIC TRAY

Molded of glass fiber and polyester resin, this tote tray is said by Firestone Tire & Rubber Co. to represent a new application of reinforced plastic for industry. The seven-lb pans have a good strength-to-weight ratio and flexibility. Rounded ends permit them to travel easily on conveyor lines, and each pan is molded with slotted carrying handles, as shown.



**BOANO BODY BUILT BY HAND FOR FERRARI CHASSIS**

This special hand-made convertible body, designed and built by Boano of Italy for the Ferrari 250 Gran Turismo chassis, has low rear fenders that are functional as well as ornamental. Wrap-around windshield allows for maximum visibility, while retaining the straight lines running from the A-post down to the frame to provide high structural rigidity. Gear shift lever is mounted on the floor; steering wheel is of the telescoping type; and wire wheels were specially designed.

# News of the AUTOMOTIVE

## AMC V-4 Engine Uses Many Aluminum Components

American Motors Corp. reports that it has received a number of inquiries from manufacturers of industrial and construction equipment regarding its new aircooled V-4 engine (see AI, Aug. 15, p. 52). This field of application is in addition to its likely uses in smaller passenger, commercial, or military vehicles.

Several prototype V-4 engines are undergoing dynamometer endurance

testing compatible with military engine test procedures. The basic engine will operate on regular service station fuels and, in fact, is being tested with a military type fuel on which it performs satisfactorily.

With the cooperation of the Aluminum Co. of America, die-cast aluminum parts are contemplated for all of the major parts of the structure including: individual cylinder barrels

with cooling fins; cylinder heads with cooling fins; cylinder head covers, timing gear housings, and blower support bracket. The intake manifold, too, is of aluminum but because of its jacketing will have to be a sand casting.

Individual cylinder barrels have bores plated with a coating of hard chromium about 0.0035 in. thick. Eatonite inserts are employed for valve seats, and a Helicoil insert for spark plugs. Pistons are of aluminum alloy with three rings—two cast iron compression rings and one steel oil ring.

A single-barrel Carter downdraft carburetor is used. Copper-lead precision bearings are used for the mains and connecting rods.

The counterweighted crankshaft is of drop-forged steel, and connecting rods are made of steel forgings. Hydraulic valve tappets are specified as standard equipment. The engine features full pressure lubrication.

A blower is mounted at the front with the air stream directed through ducting at the Vee to sweep the cylinders and heads, exhausting through openings on the outside. An oil cooler is located in the Vee, where it is swept by the air stream.

Camshaft drive is by means of a steel gear on the crankshaft meshing with a molded phenolic type gear on the camshaft.

## New Delco-Remy Plant Ships First Batteries

First shipments of batteries from Delco-Remy's new plant in Olathe, Kans., started last month (August). Production is expected to be increased gradually in the next few weeks until it reaches the point where the plant eventually will be able to supply all the battery requirements of the two GM car assembly plants in Olathe and the B-O-P assembly plant at Arlington, Tex.

In addition to original equipment batteries, the plant will build both six and 12-volt dry charge batteries for the replacement market. The new Delco-Remy unit is the country's first battery plant in which the plant area is largely air conditioned.

## 1956 WEEKLY U. S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

	For Weeks Ending				Total Jan. 1 to Aug. 18, 1956
	Aug. 18	Aug. 11	Aug. 4	July 28	
<b>PASSENGER CAR PRODUCTION</b>					
Hudson	0	0	314	296	19,657
Nash	0	12	1,088	1,140	47,686
Total—American Motors	0	12	1,403	1,436	67,343
Chrysler and Imperial	85	2,837	2,275	1,889	79,169
De Soto	1,924	1,888	1,682	889	68,755
Dodge	1,686	4,479	5,478	4,426	136,455
Plymouth	9,596	9,705	9,797	9,955	308,166
Total—Chrysler Corp.	13,291	18,809	19,230	18,669	592,546
Ford	22,447	28,852	28,312	28,527	884,094
Lincoln and Continental	9	12	371	1,051	33,117
Mercury	4,721	4,847	5,060	8,439	176,079
Total—Ford Motor Co.	27,177	31,511	33,743	36,017	1,083,290
Buick	9,608	10,039	9,555	9,515	384,358
Cadillac	3,080	3,211	3,048	3,151	104,327
Chevrolet	30,890	29,920	29,600	29,811	1,074,610
Oldsmobile	7,723	8,085	7,935	8,108	304,004
Pontiac	5,714	5,747	5,997	5,490	227,718
Total—General Motors Corp.	56,815	58,582	55,735	56,076	2,086,015
Packard	0	0	0	0	13,289
Studebaker	991	1,255	948	1,140	54,082
Total—Studebaker-Packard Corp.	991	1,255	948	1,140	67,371
Checker Cab	78	79	56	104	2,306
Total—Passenger Cars	98,352	108,348	111,015	111,442	3,917,670
<b>TRUCK PRODUCTION</b>					
Available	10	0	10	9	248
Chevrolet	7,386	6,536	7,121	6,002	239,923
G. M. C.	1,546	1,520	1,722	1,703	61,630
Diamond T	101	110	100	106	3,258
Divco	60	60	60	74	2,513
Dodge and Fargo	2,090	1,379	2,045	1,866	58,567
Ford	5,704	6,314	6,381	6,240	201,595
International	2,198	2,273	2,320	2,379	88,690
Mack	289	318	312	406	11,816
Marmon-Herrington	30	30	30	27	440
Ree	90	91	92	96	2,498
Studebaker	411	406	460	464	10,590
White	385	347	35	45	11,572
Willys	1,280	0	0	1,309	37,091
Other Trucks	112	127	127	133	4,784
Total—Trucks	21,673	19,511	20,815	21,463	735,235
Buses	78	82	94	92	2,840
Total—Motor Vehicles	21,752	19,583	20,909	21,575	738,084

# AND AVIATION INDUSTRIES



## ALL-ALUMINUM DUMP TRAILER

Perfection Steel Body Co. recently fabricated its first all-aluminum dump trailer from metal supplied by Aluminum Co. of America. It is 20 ft long, 8 ft wide, 4 ft high, and is fabricated from 3/16-in. sections of Alcoa 5154-H32 alloy.

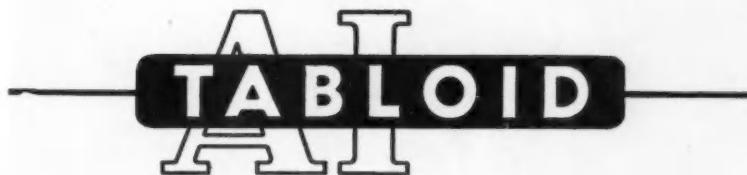
## 125-mph Air Speed Possible With New Ford Wind Tunnel

A wind tunnel, which will be able to produce air speeds of up to 125 mph, is being constructed by Ford at its Research and Engineering Center in Dearborn, Mich. The 28,000 sq ft installation will be used for testing automobile and truck heating systems and ventilation and air-conditioning units, in addition to radiator development work and aerodynamics studies.

The high velocity in the tunnel will be possible through the use of a 20 ft diam, axial flow fan driven through a variable speed coupling by a 2500-hp synchronous motor. A giant refrigeration system will enable engineers to maintain tunnel temperatures at any level between zero and 150 F.

## Chevrolet Pays Workers Record Amount For Ideas

Chevrolet paid out \$260,075 to its employees for suggestions submitted by them during the first half of this year, a record amount for a six-month period. Based on Chevrolet's experience, more and more employees apparently are showing interest.



Bristol Aero-Engines, Ltd., has developed a new ramjet engine called the "Thor."

Minnesota Mining & Manufacturing Co. has purchased control of Zenith Plastics Co. . . . Hupp Corp. has acquired a controlling interest in Apparatenbouw Nedalo NV, of Hengelo, The Netherlands.

Perry-Fay Co. is celebrating its 50th anniversary this year.

Tung-Sol Electric, Inc., has acquired a 35,000 sq ft warehouse in Irvington, N. J., as a supply point for both automotive and electronic products for its eastern sales office.

Surface Combustion Corp. has completed a new 20,000 sq ft plant addition.

Allison Div. of General Motors Co. has located its Petroleum Industry sales office in Dallas, Tex. . . . S-P Manufacturing Corp. has moved to its new plant in Solon, Ohio.

Clearing Machine Corp. has produced a color sound movie on an automated press line to produce automotive wheels.

Bell Aircraft Corp. is planning to build new scientific laboratories to explore unknown frontiers in super speeds and their allied heat problems.

Chain Belt Co. has established new Industrial Equipment and Construction Machinery Sections.

Thermistor Corp. of America and Vibro-Ceramics Corp. have merged with Gulton Mfg. Corp., which has changed its name to Gulton Industries, Inc.

Firestone Tire & Rubber Co. is setting up a rubber-producing plantation near Itubera, Brazil.

Four Wheel Drive Auto Co. has announced that the German-made Deutz V-8 aircooled Diesel engine now is available on FWD 32,000 through 40,000-lb four-wheel-drive and 36,000 through 40,000-lb six-wheel-drive trucks.

Arma Div. of American Bosch Arma Corp. is developing a guidance system of excellent accuracy for the Air Force ballistic missile program.

Bell Aircraft Corp. has leased the former Glowmeter Corp. plant in North Tonawanda, N. Y.

Premco Products, Inc., will produce British Harmark foundry products in the U. S.

Lockheed Aircraft Corp. will name its new line of Constellation planes the "Super Stars." . . . The name "Trojan" has been officially designated for North American Aviation's T-28C trainer.

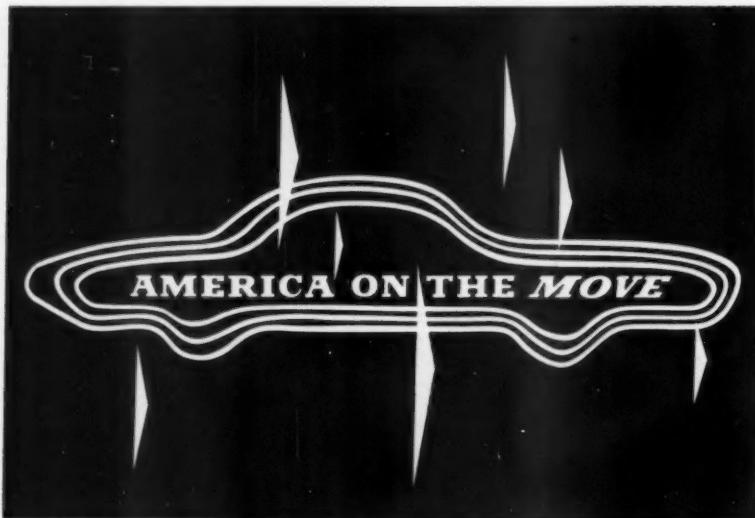
Utica Drop Forge & Tool Corp. is undertaking an expansion program for the production of jet turbine blades.

The French Ford will be assembled in Mexico.

Rootes Motors, Inc., has announced a new type commercial truck for use in loading and unloading aircraft. . . . Industrias Mexico, S. A., has introduced a new small tractor called "El Totoro" with a weight of only 572 lb but with enough power to push a two-ton load.

(Turn to page 222, please)

# News of the AUTOMOTIVE



**OFFICIAL NATIONAL AUTOMOBILE SHOW SYMBOL**

The sculpture for the 42nd National Automobile Show consists of a linear outline of an automobile (gold), containing the show theme "America on the Move" (red-orange), accented by a triangular directional motif (turquoise). The symbol will be used in exterior and interior decoration of the New York Coliseum, where the NAS will be staged Dec. 8 to 16. It will be the first national show to be held in 16 years.

## **Thew Shovel Borrows \$5 Million For Expansion, Debt Retirement**

Thew Shovel Co., Lorain, Ohio, will borrow a total of \$5 million from three Cleveland banks and an insurance company for further expansion,

purchase of new equipment and to retire previous debts. Current indebtedness includes capital borrowed from building and equipment, the acquisi-

tion of Dixie Crane Shovel Co. and Byers Machine Co., and the purchase of a majority interest in the Artisan Metal Works Co. of Cleveland.

## **Ike Signs Bill Giving Dealers Right To Sue Car Manufacturers**

Although car dealers won their fight to put into law a bill which will give them the right to sue manufacturers, there are still many legal problems in the new legislation which car makers are almost certain to challenge. The new law, signed reluctantly by President Eisenhower, gives each of the country's 40,000 new car dealers a right to sue his manufacturer if he has a claim of bad faith.

Up to now, no one has been able to give a clear definition of what constitutes "bad-faith" on the part of a manufacturer, an aspect of the bill which will certainly be contested in courts by the manufacturers. The new law is seen by many as only a partial solution to the problem of dealer relationships with the factory. President Eisenhower himself has directed anti-trust enforcement agencies to find some other method of meeting dealers' complaints if possible.

The new law could result in litigation similar to that ruled upon recently in the state of Colorado. A special three-judge Federal court in that state last month ruled invalid a 1955 Colorado law that made it a criminal offense for a car manufacturer to cancel a dealer's contract without court order, and prohibited the factory from forcing items on a dealer.

## **Kearney & Trecker Earnings Ahead Of First Six Months**

Kearney & Trecker Corp. plans to sell its Walker-Turner Div. and use the capital to further develop its special machinery division. Purchased in 1948, the division has been producing light metal and woodworking power tools.

Kearney & Trecker earnings in the quarter ended June 30 totaled \$119,000, about \$13,000 higher than during the first six months of its fiscal year. The company now has on hand some \$10 million in orders for aircraft machine tools.

## **1956 RETAIL CAR SALES BY PRICE GROUPS\***

### **Number of Cars**

Price Group	June		Six Months		
	1956	1955	1956	1955	
Under \$2,000	Units†	% of Total	Units†	% of Total	
\$2,001 to \$2,500	102,961	19.38	379,572	56.10	
\$2,501 to \$3,500	283,593	53.42	210,082	31.04	
Over \$3,500	123,876	23.33	65,447	10.26	
Total	530,886	100.00	676,636	100.00	
	3,047,042		100.00	3,525,392	100.00

### **Dollar Volume of Sales**

Price Group	June		Six Months		
	1956	1955	1956	1955	
Under \$2,000	Dollars	% of Total	Dollars	% of Total	
\$2,001 to \$2,500	\$ 202,284,131	16.34	\$ 719,814,514	48.77	
\$2,501 to \$3,500	608,255,746	49.12	490,036,605	33.20	
Over \$3,500	236,906,853	27.37	195,168,548	13.22	
Total	\$ 1,236,197,644	100.00	\$ 1,475,957,260	100.00	
	37,130,340,286		100.00	\$ 7,775,627,491	100.00

\*—Calculated on basis of new car registrations, as reported by R. L. Polk & Co., in conjunction with advertised delivered price at factory of four door sedan or equivalent model. Does not include transportation charges or extra equipment.

†—New registrations of American-made cars only. Does not include imported foreign cars.

# AND AVIATION INDUSTRIES

## Dodge Survey Shows "Sixes" Popular In Larger Cities

While the six-cylinder engine is continuing to lose ground to the V-8 powerplant in automobiles, it surprisingly still accounts for a substantial part of the market in certain areas of the country, according to Dodge Division. In conjunction with a report on production of its four-millionth six-cylinder engine last month, Dodge noted that in the New York metropolitan area, sixes account for nearly 27 per cent of the total number of cars sold.

The six-cylinder engine appears to be most popular in larger metropolitan cities, particularly those along the Atlantic Seaboard, and for a simple reason. Many motorists feel it is more economical to operate a six-cylinder car in areas which are governed by strict speed laws. In other metropolitan areas, sixes comprise from six to 10 per cent of the market. On the other hand, only two per cent of the Dodge buyers in non-metropolitan areas prefer the six-cylinder engine.

Dodge introduced its first six-cylinder engine in 1927. Currently, sixes are accounting for about 14 per cent of Dodge production against 11 per cent for the 1955 model year.

## GE Awards to Allis-Chalmers Contract For Jet Components

A multi-million dollar contract for production of compressor rotors for J-79 turbojet engines has been given to Allis-Chalmers Manufacturing Co. The company will manufacture the units under a subcontract from General Electric Co.

## Automatic Regulator Featured In New Clocks For 1957 Cars

A new device, which is said to help clocks in automobiles keep more accurate time, has been developed by the Westclox Div. of General Time Corp. It is an automatic regulator which compensates for timing errors generally resulting from bumps, jolts, and variations in temperature.

With the new device, the manual

## CHEVROLET FAR OUT IN FRONT ON MARKET GAIN 1956 New Passenger Car Registrations\*

Arranged by Makes in Descending Order According to the 1956 Six Months' Totals

MAKE	SIX MONTHS				
	June 1956	May 1956	June 1955	1956	1955
Chevrolet.....	148,540	147,942	164,000	805,100	756,317
Ford.....	120,686	123,114	140,699	665,733	741,481
Buick.....	46,060	50,770	69,574	294,194	381,693
Plymouth.....	43,024	46,941	63,567	257,318	343,711
Oldsmobile.....	39,561	40,069	51,383	238,201	290,595
Pontiac.....	31,664	33,072	50,075	192,313	265,314
Mercury.....	24,611	26,117	36,202	142,622	178,380
Dodge.....	20,780	20,865	25,740	113,357	146,026
Cadillac.....	12,433	13,539	11,740	73,509	74,029
Chrysler.....	10,557	11,221	15,027	62,798	80,241
De Soto.....	9,133	9,712	11,639	53,660	63,217
Studebaker.....	6,322	7,382	8,633	44,441	53,325
Nash.....	7,171	7,970	10,666	42,619	47,281
Lincoln.....	3,877	4,144	3,225	21,898	15,500
Hudson.....	3,256	3,684	4,883	18,773	23,643
Packard.....	2,772	3,363	5,356	17,781	26,796
Continental.....	105	132	—	937	—
Misc. Domestic.....	472	431	666	1,829	5,345
Foreign.....	8,733	7,716	4,568	40,803	21,386
Total—All Makes....	539,777	560,014	681,372	3,088,467	3,519,629
				100.00	100.00

\* Based on data from R. L. Polk & Co.

adjusting device on the clock is eliminated. Each time the clock is reset to the correct time by the pull-and-turn hand stem, a special mechanism moves the automatic regulator a small amount in the direction required to compensate for timing error.

If the hands are set forward to correct a clock which has been run-

ning slow, for example, the regulator will make the clock run at a faster rate. If the hands are set backward, the clock will automatically adjust itself to a slower rate. The company says that the automatic regulator will be installed in clocks to be used on most 1957 cars.

(Turn to page 233, please)

## TRUCK SALES UP 21,000 UNITS IN HALF OVER 1955

### 1956 New Truck Registrations\*

Arranged by Makes in Descending Order According to the 1956 Six Months' Totals

MAKE	SIX MONTHS				
	June 1956	May 1956	June 1955	1956	1955
Chevrolet.....	26,547	28,455	34,144	153,257	138,458
Ford.....	23,418	25,304	24,392	134,407	140,391
International.....	8,964	10,267	9,422	54,681	51,568
G. M. C. ....	6,943	7,889	8,740	43,326	33,098
Dodge.....	5,780	5,844	6,387	29,431	32,346
White.....	1,324	1,464	1,238	8,089	8,616
Mack.....	1,064	1,269	1,005	6,578	4,946
Willys Truck.....	1,174	1,177	1,334	6,573	7,985
Studebaker.....	711	915	1,080	5,021	5,883
Willys Jeep.....	718	760	833	4,013	4,642
Diamond T.....	301	361	324	2,030	1,729
Dive.....	310	312	343	1,717	1,671
Reo.....	311	289	278	1,545	1,328
Kenworth.....	126	127	98	623	497
Brockway.....	100	99	100	536	516
Peterbilt.....	77	64	52	291	221
F. W. D. ....	32	44	18	221	115
Misc. Domestic.....	124	81	38	571	357
Foreign.....	477	296	181	2,097	746
Total—All Makes....	78,501	84,997	90,005	455,007	434,113
				100.00	100.00

\* Based on data from R. L. Polk & Co.

# Men in the News



*Aro Equipment Corp.*—**Marquand J. Anderson** has been elected president.

**U. S. Rubber Co.**—**John W. McGovern** has been elected executive vice-president.

**Vinco Corp.**—**Edward J. Eggart** was elected president.

**Minneapolis-Honeywell Regulator Co., Ltd.**—**W. H. Evans** has been elected president.

**Chrysler Corp., Automotive Group**—**Fred M. Glassford** has been appointed manufacturing director; **B. W. Bogan**, executive engineer; **William G. Knuff**, director of forward planning; **Jack Freeman**, chief operations analyst; **Carl W. Layman**, chief industrial engineer; and **H. Hald Zeder**, manufacturing specialist.

**Pontiac Motor Div., General Motors Corp.**—**John F. Blamy** is now chief inspector.

**New Departure Div., General Motors Corp.**—**Seth H. Stoner** and **Frederick J. Garbarino** were made chief engineer and divisional director of quality control, respectively.

**Borg & Beck Div., Borg-Warner Corp.**—**Paul Jones** has been appointed works manager.

**American Motors Corp.**—**John G. Staiger** has been named assistant to the vice-president in charge of operations.

**Hupp Corp.**—**Fred W. Hottenroth** has been elected vice-president in charge of technical sales.

**Harrison Radiator Div., General Motors Corp.**—**J. Robert Jackson** has been made service manager.



*Muskegon Piston Ring Co.*—**Douglas W. Hamm** has been named director of product engineering.

**Goodyear Tire & Rubber Co., Tire Div.**—**O. E. Miles** has been appointed sales manager, and **R. W. Fitzgerald** was named general merchandising manager.

**Motor Wheel Corp.**—**Alexander Brede** has been named director of new product development.

**Chrysler Corp., Export Div.**—**Harlan E. Mills** was named executive vice-president; **Kenneth E. Thompson**, vice-president of sales; and **Keith H. Kingsley**, vice-president of manufacturing operations.

**H. W. Loud Machine Works, Inc.**—**E. A. Williams** was appointed vice-president and general manager.

**Brown Instruments Div., Minneapolis-Honeywell Regulator Co.**—**O. B. Wilson** was named vice-president.

**Chrysler Corp., Defense Operations Div.**—**H. Douglas Lowrey** and **Albert R. Walcott** have been appointed director of manufacturing and manager of industrial relations, respectively.



*E. W. Bliss Co.*—**James T. Harrington** was appointed secretary.

**Freightliner Corp.**—**Kenneth W. Self** has been elected vice-president.

**TelAutograph Corp.**—**Julius Fligelman** has been elected chairman.

**Allegheny Ludlum Steel Corp., Forging and Casting Div.**—**Marlin R. Hemphill** has been appointed general manager.

**Mack Trucks, Inc., Parts Div.**—**James J. Madison** is now merchandising manager.

**Yates-American Machine Co.**—**C. K. Olsen, Jr.** has been elected vice-president and director of sales.

**Thompson Products, Inc., Michigan Div.**—**Robert M. Lynas** has been named head of the Industrial Engineering Dept.

**Rohr Aircraft Corp.**—**Fred H. Rohr** was named chairman of the board, and **J. E. Rheim** succeeds him as president and general manager.

**Cleveland Cap Screw Co.**—**Andrew V. Wetzel** has been named chief metallurgist.



**Utica Div., Bendix Aviation Corp.**—**Charles E. Humer** has been chosen staff assistant to the general manager, and **Alan J. Dodd** has become director of purchases.

**Plymouth Div., Chrysler Corp.**—**Louis T. Hagopian** has been appointed director of advertising and sales promotion.

**Oldsmobile Div., General Motors Corp.**—**Daniel T. Bogart** has been appointed coordinator of dealer relations.

**North American Aviation, Inc.**—**J. S. Smithson** was named vice-president for administration.

**B. F. Goodrich Tire Co.**—**Guy Gundaker, Jr.** and **J. T. Callahan** have been elected vice-presidents.

**Micrometrical Mfg. Co.**—**Fritz A. Zander** and **Frank W. Kabat** have been promoted to executive vice-president and director of sales, respectively.

**Chrysler Corp., Stamping Div.**—**Joseph F. Kerigan** is now general manager.

**B. F. Goodrich Tire Co.**—**Chester T. Morledge** was made general manager for special brand sales.

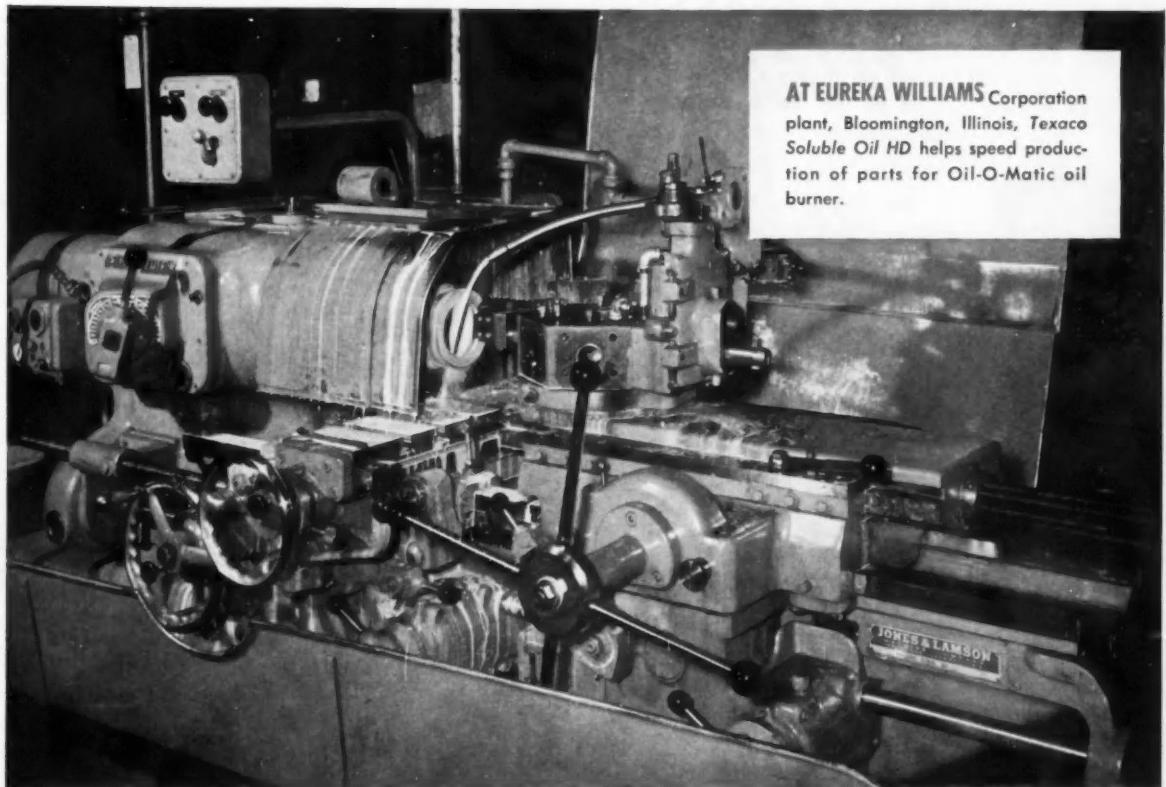
**Firestone Tire & Rubber Co., Guided Missile Div.**—**Daniel T. Sigley** has become chief engineer.

**Kaiser Aluminum & Chemical Corp.**—**M. C. Crockett** was made automotive industry sales manager.

(Turn to page 66, please)

**Detroit Diesel Engine Div., General Motors Corp.**—**Eugene K. Kelly** has been appointed works manager.





AT EUREKA WILLIAMS Corporation plant, Bloomington, Illinois, Texaco Soluble Oil HD helps speed production of parts for Oil-O-Matic oil burner.

Eureka Williams' experience shows how you can  
**INCREASE PRODUCTION  
REDUCE COSTS**

"Ours is the oldest name in automatic heating," says Eureka Williams Corporation, "and a big factor in maintaining our position in this highly competitive field has always been our ability to keep our production quality up and our costs low.

"*Texaco Cutting, Grinding and Soluble Oils* — which we have used for more than ten years — have helped us a lot by giving us exceptionally long tool life, eliminating rusting problems and assuring

better finish."

Why not enjoy these benefits in your plant? There is a complete line of *Texaco Cutting, Grinding and Soluble Oils* to help you do all your machining better, faster and at lower cost. A Texaco Lubrication Engineer will gladly help you select the proper ones.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



EUREKA WILLIAMS Oil-O-Matic Warm Air Furnaces feature "sealed in steel" construction for cleaner heat, new heat exchanger designed to cut fuel bills. Eureka Williams also makes Gas-O-Matic and Air-O-Matic heating and air conditioning units. Parts for all of them are machined with *Texaco Cutting, Grinding and Soluble Oils*.



# TEXACO

CUTTING, GRINDING,  
SOLUBLE AND  
HYDRAULIC OILS

# Men in the News



**Holcroft & Co.**—  
George C. Wilsher  
has been appointed  
vice-president in charge  
of engineering.

(Continued from page 64)

**Utica Div., Bendix Aviation Corp.**—**Bernard T. Wasdyke** was made superintendent of experimental engineering.

**Barber-Colman Co., Wheelco Instruments Div.**—**H. H. Kieckhefer** has been appointed sales manager.

**Modine Mfg. Co.**—**G. H. Jackson** was named vice-president in charge of manufacturing.

**Dodge Mfg. Corp.**—**Donald Saunter** has been promoted to director of production and purchasing.

**Nelson Muffler Corp.**—**Joe F. Gettrust** is now general sales manager.

**Greer Hydraulics, Inc.**—**Cecil Barlow** and **Melvin Schoenberg** have been named manufacturing superintendent and planning supervisor, respectively.

**Wickes Machine Tool Div., Wickes Corp.**—**Joseph A. Oeming** is now sales manager.

**Minneapolis-Honeywell Regulator Co., Industrial Div.**—**James Dunlap** has been made sales manager for the metals processing industry.

**Solar Aircraft Co.**—**W. C. Heath** has been named projects manager.

**Lindberg Engineering Co.**—**Richard Schoenfeld** has become administrative assistant.

**Long Mfg. Div., Borg-Warner Corp.**—**Howard E. Blood, Jr.**, has been appointed administrative assistant to the president.

**North American Aviation, Inc.**—**W. F. Snelling** has been appointed factory manager, while **H. E. Harris** has been chosen director of quality control.

**Metbond Co.**—**Lawrence R. Steinhardt** has been appointed president.

**Borg-Warner Corp., Atkins Saw Div.**—**Lawrence T. Peifer** is now administrative vice-president.

**General Tire & Rubber Co.**—**Robert Moran** has been promoted to manager of defense and new products sales.

**Lavallee & Ide, Inc.**—**C. A. Pafenbach** has been made vice-president in charge of sales.

**Utica Div., Bendix Aviation Corp.**—**Robert L. Wharton** was named supervisor of production planning and stores.

**Westinghouse Electric International Co.**—**W. L. Carroll, R. L. Jeans, W. D. Lewis, and A. B. McCloskey** have been elected vice-presidents.

**Superior Tube Co., Nuclear Products Div.**—**John B. Giacobbe** is now director.

**Consolidated Electrodynamics Corp.**—**William F. Johnson** has been appointed director of sales, and **Russell R. Palmer** was made manager of sales operations.

**Dewey & Almy Chemical Co., Battery Separator Div.**—**T. G. Gibian** has been promoted to general manager.



**Tube Reducing Corp.**—**Arthur J. Williamson** has been promoted to executive vice-president.

**Vickers, Inc.**—**John T. Burns** is now manager of the western region for aircraft products sales.

**Saginaw Products Corp.**—**William D. P. Dooley** has been chosen sales manager.

**Network Electronics & Missile Research Engineering Corp.**—**H. J. Mock** has been named president; **Frank Ramsauer**, vice-president; and **Mihai Patrichi**, chairman of the board and chief engineer.

**Topp Industries, Inc.**—**Lt. Gen. Elwood R. Quesada (Ret.)**, is now chairman of the board and chief executive officer.

**Climax Molybdenum Co.**—**Herbert Geittman, Jr.**, now heads development effort on castings for the machine tool industry.

**Thompson Products, Inc., Michigan Div.**—**W. D. Angst** has been made manufacturing manager.



**Vickers Inc.**—**A. R. Cavitate** has been named aircraft service director.

(Turn to page 192, please)

## Necrology

**Freas M. Long**, 72, retired director of foreign sales for Gisholt Machine Co., died recently, at Madison, Wis.

**Alvin C. McCord**, 88, founder and board chairman of McCord Corp., died Aug. 6, at Detroit, Mich.

**Dent W. Sanford**, 65, vice-president of Goodyear Tire & Rubber Co. of California, died Aug. 6, at Los Angeles, Calif.

**Hugh L. Adams**, 74, a co-founder and retired vice-president of the Budd Co., died Aug. 6, at New York, N. Y.

**Timothy C. Downey**, 63, retired works manager for Oldsmobile Div. of General Motors Corp., died Aug. 6, at Detroit, Mich.

**Frederick G. Morley**, 77, chairman of the board of Great Lakes Engineering Works, died Aug. 5, at Detroit, Mich.

**John H. Lapham**, 71, a director of the Texas Co., was killed in a plane crash Aug. 3, near Bandera, Tex.

**Frederic W. Wagner**, 41, vice-president of Wagner Bros., was killed in a plane crash Aug. 3, in Gladwin County, Mich.

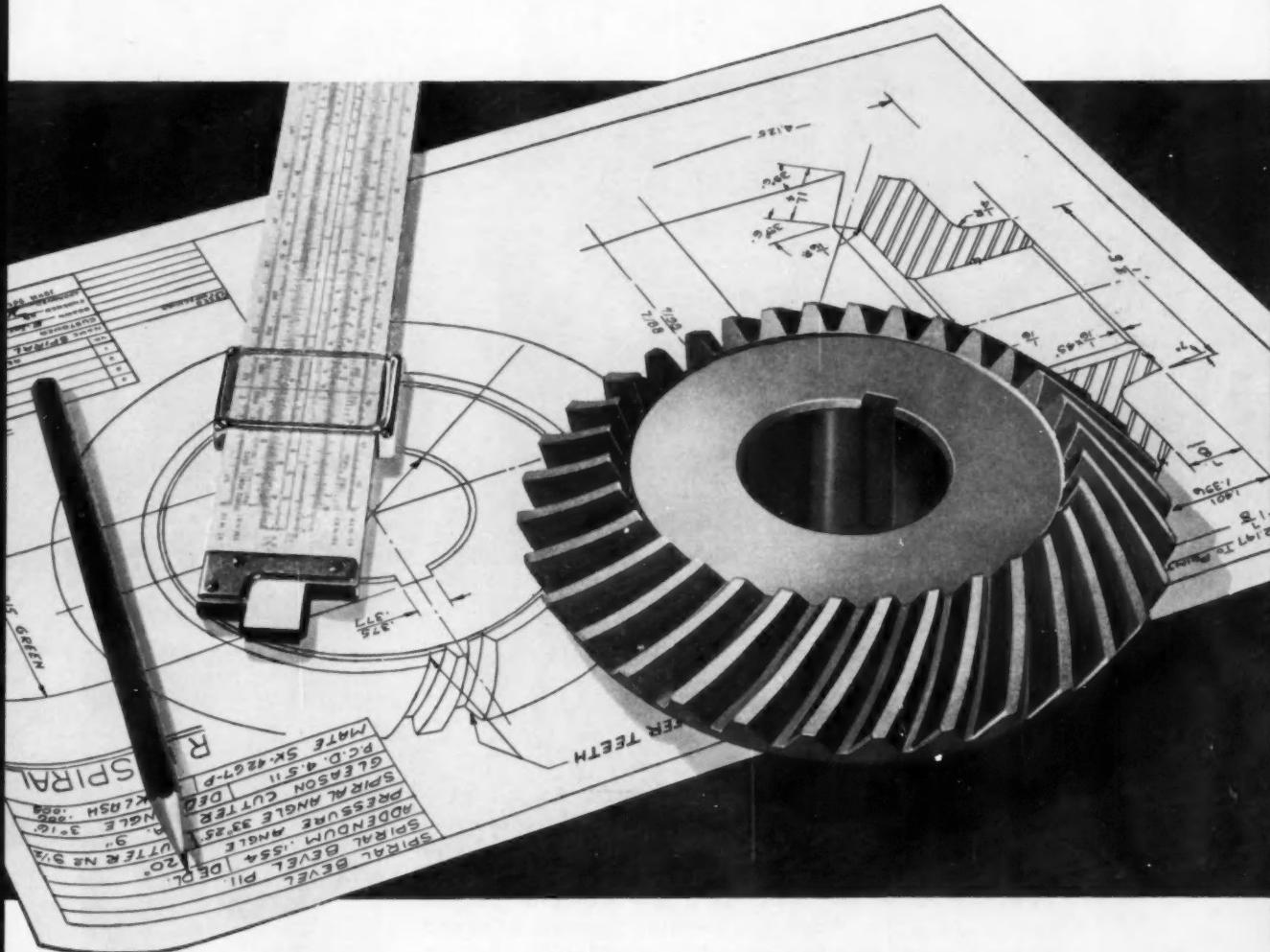
**Sidney J. Williams**, 70, former director of the Public Safety Div. of the National Safety Council, died Aug. 5, at Chicago, Ill.

**Ab Jenkins**, 73, well-known race car driver, died Aug. 9, at Milwaukee, Wis.

# "ENGINEERED QUOTATIONS"

When our engineers study our customers' prints, they look for ways to improve gear performance, ways to simplify gear installations, ways to cut gear costs. When they find a way that they consider better they report it to the customer for his consideration. Very often these "engineered

quotations" are accepted. Such careful scrutiny of every engineering and manufacturing step by *gear specialists* is one reason why so many manufacturers use Automotive Gear Works as their "gear department". May we submit an "engineered quotation" on your gear requirements?



**FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS  
GEAR-MAKERS TO LEADING MANUFACTURERS**

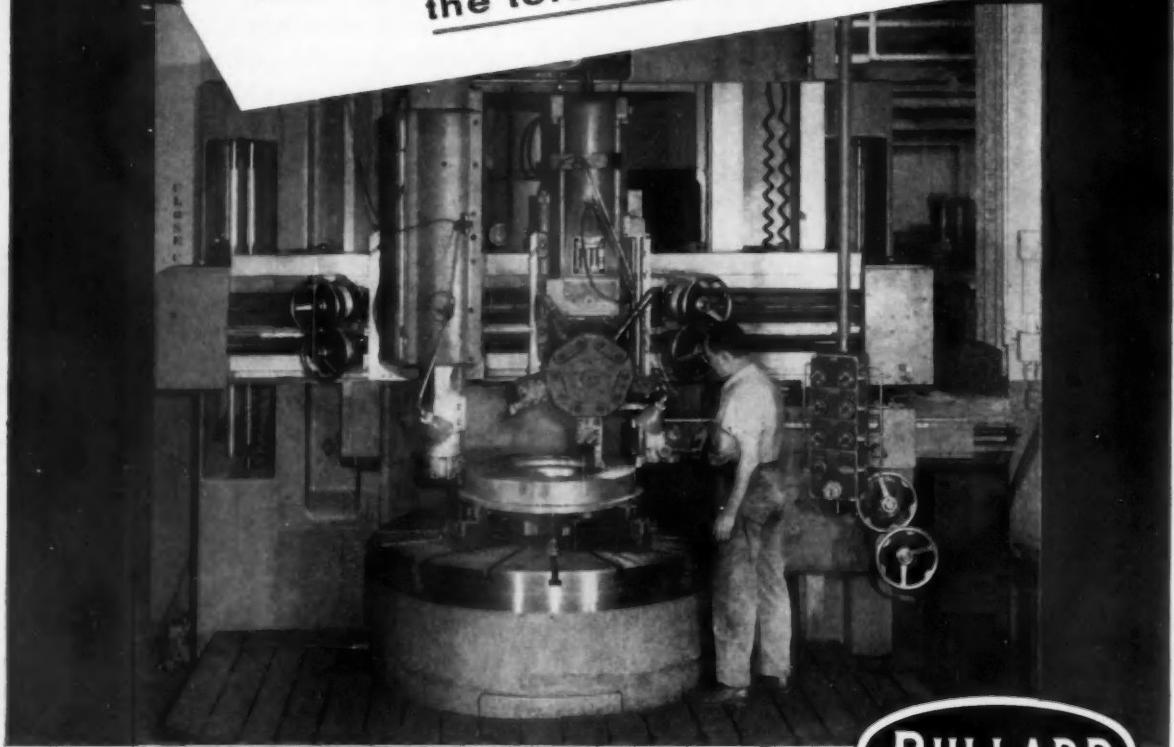
# Automotive Gear Works, inc.

ESTABLISHED IN 1914

S U B S I D I A R Y   O F   E A T O N   M A N U F A C T U R I N G   C O M P A N Y

## RICHMOND, INDIANA

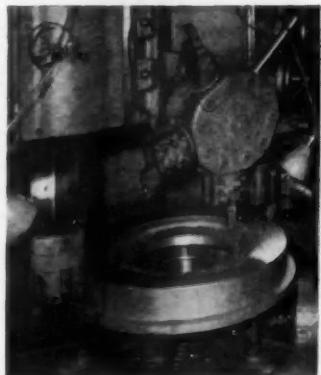
**"Few machines would hold  
the tolerances required"**



**BULLARD**

This statement by Mr. R. P. Feiser, Industrial Engineer of the York Corporation, York, Pa., is one of the reasons for their purchase of a 66" Cut Master, V.T.L., Model 75 for the machining of a rotor support for their turbomagnetic compressor.

Mr. Feiser further states that "the 66" Cut Master does this machining at a saving of 40% over any previously used machine. In addition, the pendant control and power swiveling turret head are a great convenience in operation — the result is a low operator fatigue factor. Also, the York Corporation has experienced low maintenance costs on a 60" Vertical in operation since 1928 and a 36" Vertical in operation since 1937."



*How about you?*

Are you employing these same advantages to your machining problems? If not, may we recommend that you get the complete Cut Master V.T.L., Model 75 story by calling your nearest Bullard Sales Office, Distributor or writing for a catalog to

THE  
**BULLARD**  
COMPANY  
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BORING  
BROACHING  
DEBURRING  
DRILLING  
GEAR SHAVING  
GRINDING  
HONING  
MILLING  
SHAPING  
TRANSFERRING  
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AUTOMOTIVE INDUSTRIES

1956 MACHINE TOOL &  
PRODUCTION EQUIPMENT ISSUE

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# BURGMASTER<sup>®</sup>

## AUTOMATIC HYDRAULIC TURRET DRILLS

with Power Indexing produce a "higher level of quality" at

**Bendix** Aviation Corp., Bendix Products Div., South Bend

They have this to say at Bendix, South Bend where 20 Burgmaster 6 spindle 2BH turret drills are effectively performing numerous secondary operations on aircraft parts —

"The work performed on the Burgmaster 2BH Models was previously run on 6 spindle hand-fed upright drill presses. The benefits derived over the old method of machining are:

- 1 *With the drill fixture clamped in alignment under the spindle, a higher level of quality can be maintained and repair work has dropped to a minimum.*
- 2 *Operator performs work with less fatigue.*
- 3 *The uniform hydraulic feed enables us to produce better finishes and size."*

Machine tool users everywhere are experiencing these and additional benefits such as: simplified fixturing, extreme versatility—jobs formerly done on turret lathes, chucks, hand screw machines can be done with ease on the Burgmaster; low initial cost, low maintenance, little floor space required. They are finding that here, in one highly versatile machine, drilling, reaming, counterboring, countersinking, spotfacing, tapping, O.D. threading and many other operations can be accomplished with more accuracy—with one operator.

Automatic hydraulic Burgmasters (6 and 8 spindle models) feature skip indexing, automatic cycling and infinitely variable pre-selective feeds. All models (including the 6 spindle manuals) provide power indexing, pre-selective spindle speeds and very close pre-selective depth control.



For complete information, address Dept. AI-9

**BURG TOOL**

Manufacturing Company, Inc.

15001 South Figueroa Street, Gardena, California

Sales Offices:

Ridgewood, N.J. • Chicago • San Francisco

# AI | Machine Tool SECTION

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 163

## SHAKEPROOF DIV., ILLINOIS TOOL WORKS

POWER SCREW DRIVER—Model 400 screw driver can be manually or automatically operated. In a fully automated operation, its functions



include feeding and guiding, controlling length of stroke, and maintaining a predetermined torque. It can drive as many as 60 screws per minute.

Circle 30 on postcard for more data

## SUNSTRAND MACHINE TOOL CO.

TRACER MILLING UNIT—Three-dimensional machine has a belt-driven three-hp head with four speed changes: 200, 400, 900, and 1800 rpm. Transverse and longitudinal movements of cutter are 12 in.; depth movement is 8 in. All three movements are manually controlled from a single pencil-type stylus tracing unit to enable duplication of patterns on the workpiece.

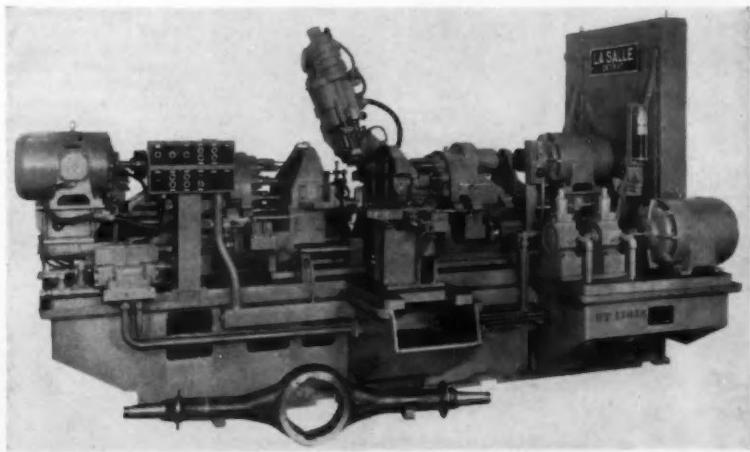
Circle 31 on postcard for more data

## LA SALLE TOOL, INC.

DRILLING MACHINE—Direct gage settings are all that are required to process each of six different housings on this driller, without additional locators. Endwise location is

taken from the flange, vertical location from the bearing diameters. Unit drills ten holes on each side and one vent hole.

Circle 32 on postcard for more data



## Machine Tool SECTION

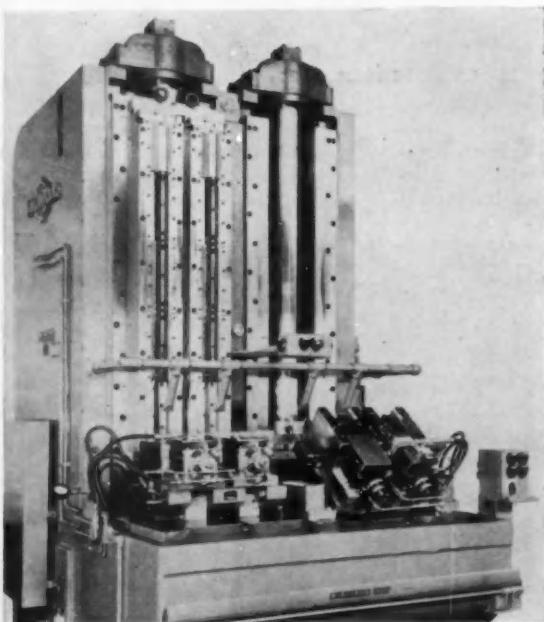
### INDEX MACHINE CO.

MILLING MACHINE—Model 45 vertical milling machine can perform milling, drilling, and boring operations. Standard one-hp, 1725-rpm motor permits nine spindle speeds, ranging from 80 to 2700 rpm. Longi-

tudinal travel with 40 by 9 in. standard table working surface is 26 in.; with optional 46 by 9 in. table working surface is 32 in. Eight feed changes, from  $\frac{1}{4}$  to  $9\frac{1}{2}$  ipm, are available. ▶

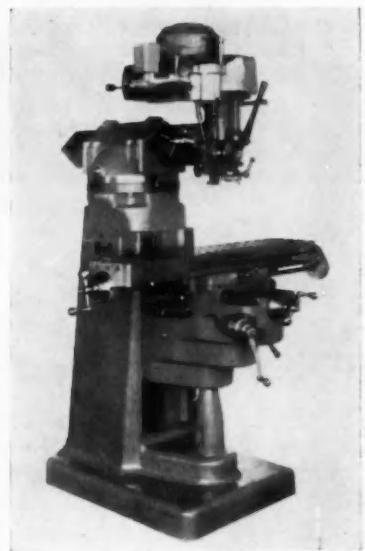
Circle 33 on postcard for more data

### COLONIAL BROACH AND MACHINE CO.



**BROACHING MACHINE** — A 15-ton, 66-in. stroke ram machine is equipped with automatically actuated tilt-up fixtures which speed broaching of connecting rod half rounds and mating faces. Production rate is 550 pieces per hour on a single machine and 27,000 pieces per broach sharpening. Fixtures are mounted in duplicate, and each fixture holds two parts.

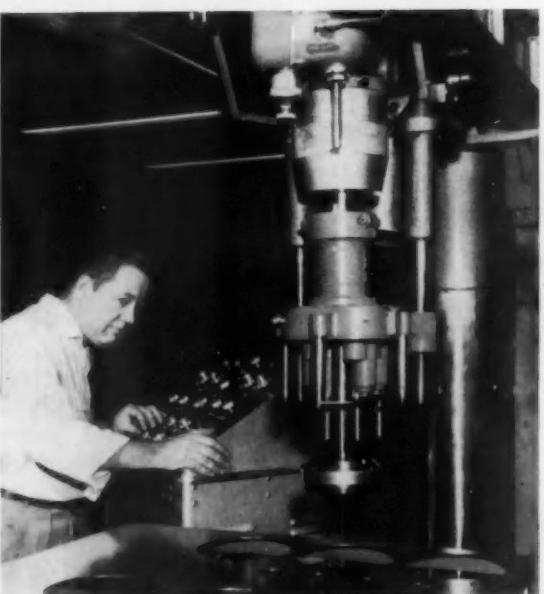
Circle 34 on postcard for more data



### FAIRCHILD AIRCRAFT DIV., FAIRCHILD ENGINE AND AIRPLANE CORP.

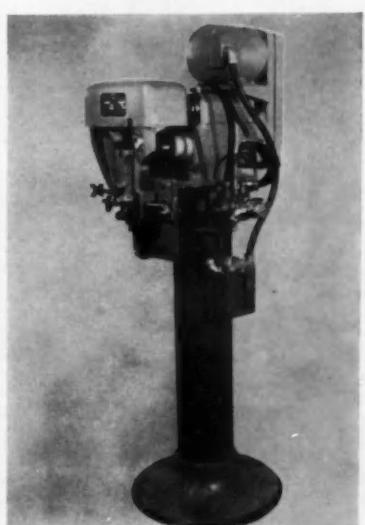
**DRILLING MACHINE** — A high-speed semi-automatic driller automatically locates and drills holes in response to saw-toothed projections on

### MINNEAPOLIS-HONEYWELL REGULATOR CO.



**DRILLING MACHINE** — An electronic control system for drilling machines enables operator to dial the X and Y coordinates of hole location, and then the control system takes over and positions the bed and the multiple-drilling head. Drilling is then a matter of button-pushing. Here an operator drills holes in a steel sheet for a master control panel.

Circle 35 on postcard for more data

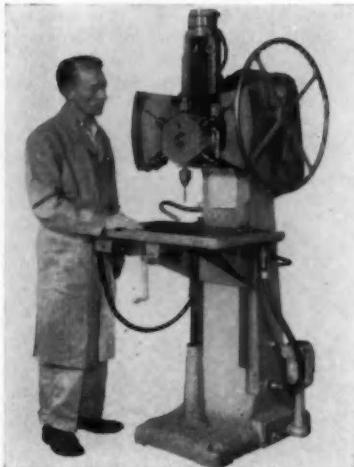


an attached template. Holes may be drilled at speeds up to three per sec in 0.064 aluminum material, holding locations to sheet metal tolerances of  $\pm 0.010$  in. Speed of operation is dependent upon hole spacing, diameter, depth, and type of material being processed.

Circle 36 on postcard for more data

**BURG TOOL MANUFACTURING CO.**

**TURRET DRILL** — Burgmaster model 1C handles holes up to  $\frac{1}{2}$ -inch in steel, has a seven-in. stroke and a speed range of 325-4050 rpm. Ma-



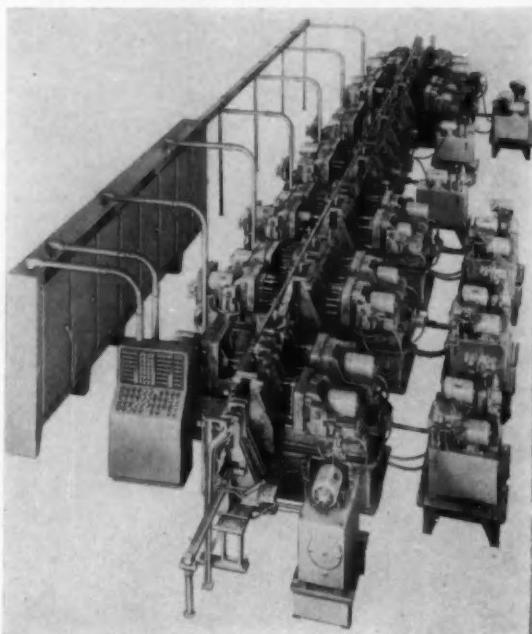
chine features fast power indexing, sensitive feed and preselective speeds and stops. It can perform any combination of six operations in one setup.

Circle 37 on postcard for more data

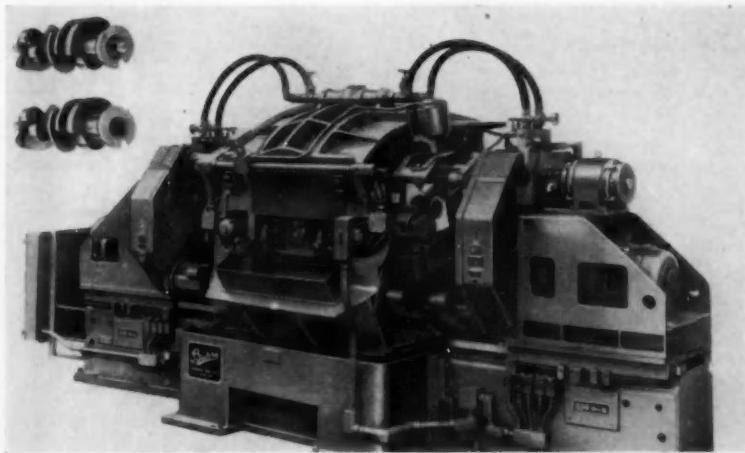
**BUHR MACHINE TOOL CO.**

**TRANSFER MACHINE** —The machine illustrated has 22 stations and performs 155 operations on two types of torque converter adapter plates. The stations consist of 1 for loading, 14 for machining (with two for mechanical inspection), 6 for visual inspection, and 1 for unloading. Each machining station is equipped with automatic part selector for unit control. Chip disposal is through center of machine into conveyor in floor. The machine performs 37 drilling, 12 reaming, 4 boring, 37 countersinking, 36 inspection, and 29 tapping operations. Production rate is 200 pieces per hour at 100 per cent efficiency.

Circle 38 on postcard for more data

**BUHR MACHINE TOOL CO.**

**DRILLING MACHINE** —Economatic machine for drilling engine crank-



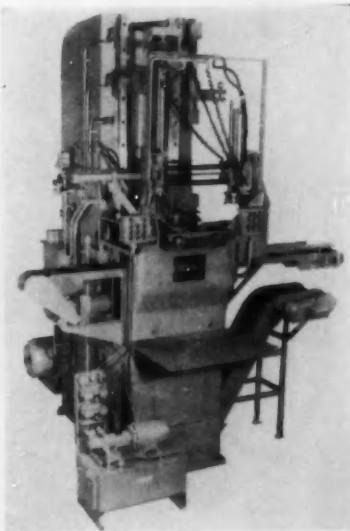
**AMERICAN BROACH & MACHINE CO.**  
**BROACHING MACHINE** —A 30-ton, 60-in. stroke pull-down broaching machine automatically broaches ten internal splines in an automotive brake drum in one pass. Designed for conveyor line automation, the machine automatically picks up parts, trans-

fers them to a broaching position, and after broaching ejects them back on the line. Tooling includes precision-type broach pullers with multiple springs and alignment pilots, a hardened and ground arbor, and HSS sectional broach assemblies approximately 48 in. long.

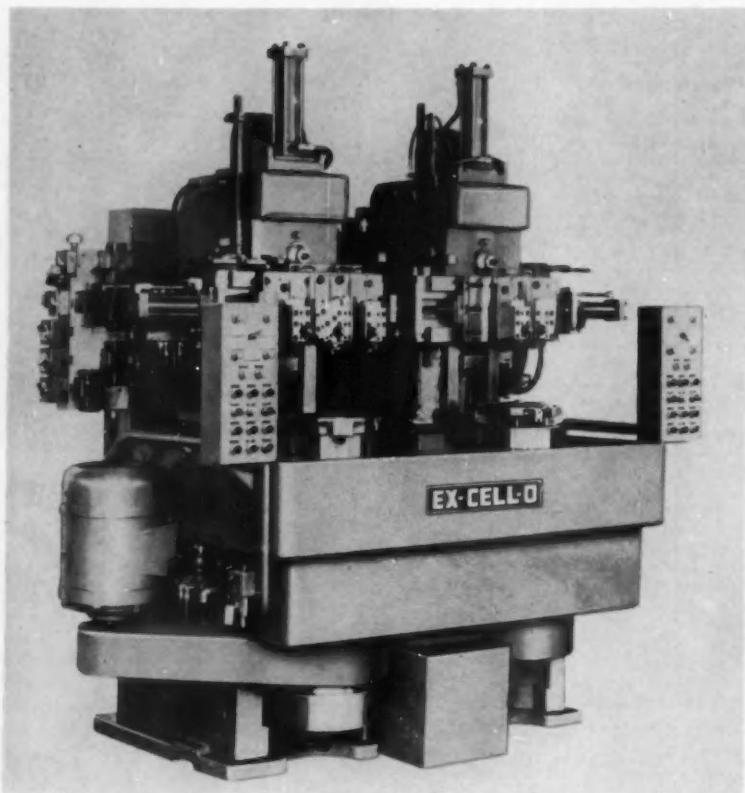
Circle 40 on postcard for more data

shafts performs 34 operations on 70 pieces per hour at 100 per cent efficiency. Features include: Powerflo indexing, powerclamping of fixtures by means of a power wrench with torque control, multiple heads of master-gear-box construction with individual cluster heads. Bushing plates register into fixtures at each station.

Circle 39 on postcard for more data



## Machine Tool SECTION

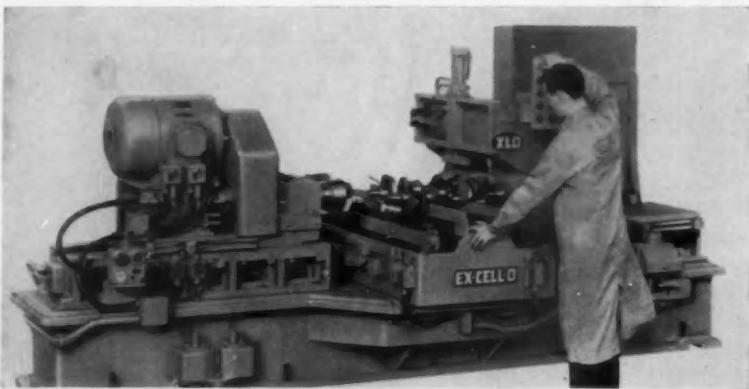


EX-CELL-O CORP.

**BORING MACHINE**—Model 432 vertical precision borer will perform turning, boring, facing, grooving, and chamfering operations in combinations or separately. Each of two stations has a separate hydraulic sys-

tem, counter-weighted compound tool slide, vertical spindle, drive equipment, and controls. Spindle speeds are easily changed with V-belt and pulley combinations.

Circle 41 on postcard for more data



EX-CELL-O CORP.

**BORING, FACING**—Designed to perform three operations simultaneously on two crankshafts, this machine will: finish bore a diameter within limits of  $-0.0005$  in. and hold the bore concentric with the main bearings; face

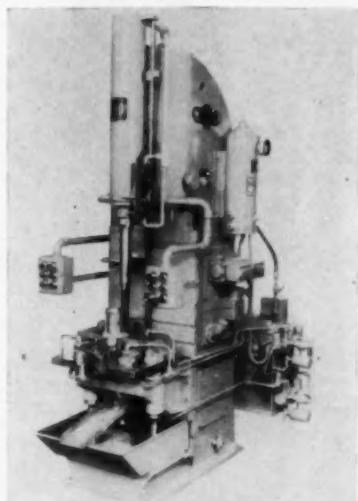
a surface square with the main bearings, and chamfer an edge. It uses two standard hydraulic slides mounted on a base, and having a fixture between them.

Circle 42 on postcard for more data

### AMERICAN BROACH & MACHINE CO.

**BROACHING MACHINE**—Hydraulic Horning type press with continuous automatic cycle broaches 30 external involute gear teeth on the OD of a bronze automotive synchronizer ring. Broaches are mounted in a stationary broach pot, through which the part is bushed. At 100 per cent efficiency, rate of production is 300 parts per hour.

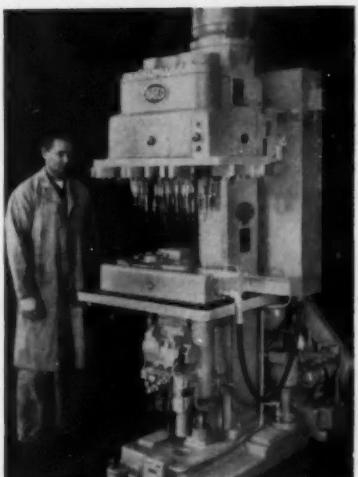
Circle 43 on postcard for more data



### NATIONAL AUTOMATIC TOOL CO.

**DRILLING MACHINE**—H6 sensitive, adjustable multi-spindle driller and tapper has a three-position automatic fixture slide and is designed to drill, chamfer, and tap holes automatically.

Circle 44 on postcard for more data



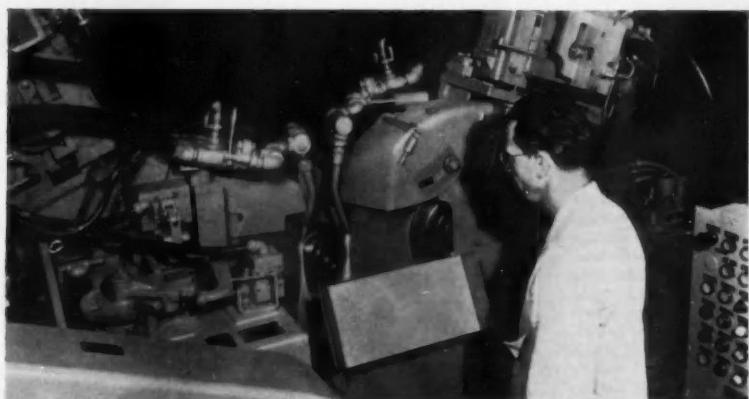
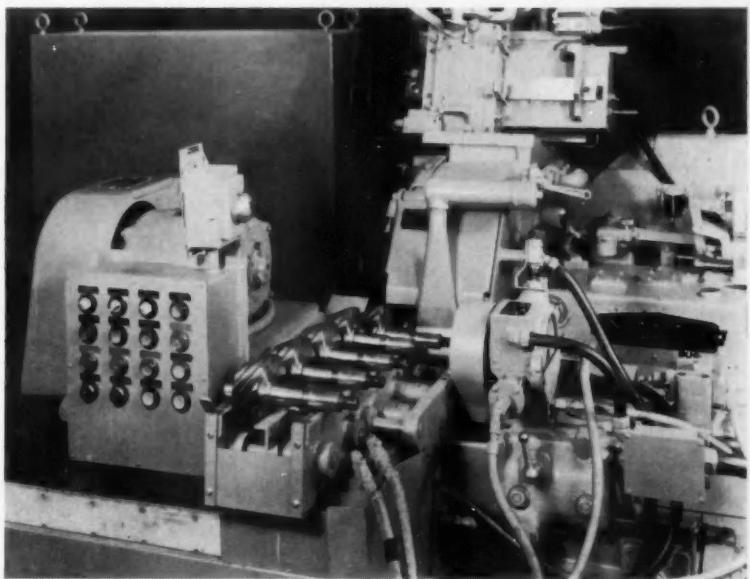
**NORTON CO.**

**GRINDING MACHINE**—Type CMS-1 grinder can be adapted to a wide range of cylindrical grinding operations. It has unitized wheel slides which mount one or more 30-in. diam grinding wheels. Individual pushbutton operated jogging control of wheel slide movement is provided. Automatic truing is accomplished by wheel guard type devices, operating at predetermined speed and feed.

Circle 45 on postcard for more data

**GRINDER**—Features of an automatic machine for grinding stem pinions include special workholding and driving equipment, with automatic loading and unloading devices. Automatic controls are incorporated to permit one operator to supervise the production of more than one machine. Interlocks insure the operations occurring in the proper order; improper action shuts down the machine.

Circle 46 on postcard for more data

**NORTON CO.**

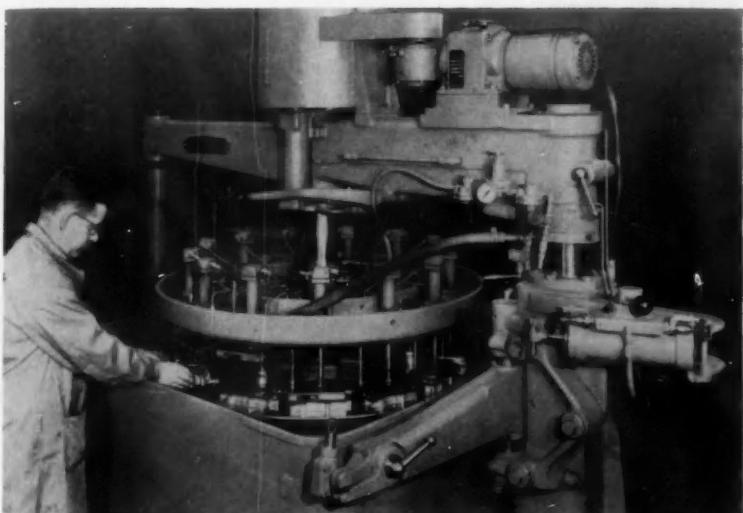
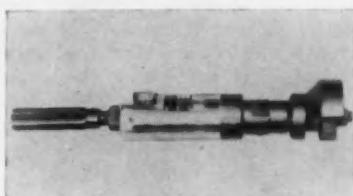
**PRODUCTION LAPPER**—No. 48F Hydrolap is designed for either single or parallel face flat lapping, and it can be adjusted for a plain timed cycle, automatic continuous feed, or semiautomatic continuous feed. Machine incorporates bonded abrasive wheel laps in conjunction with filtered coolant. Individual adjustable speed drives for both laps and the workholder provide a variety of speed combinations.

Circle 48 on postcard for more data

**THOR POWER TOOL CO.**

**AIR GRINDER**—Model 25G rotary grinder, designed primarily for precision die work, is adapted to production grinding operations and bench duties. Tool weighs two lb, has overall length of 11½ in., and wheel size of 1¾ in. bonded capacity. It operates at a speed of 20,000 rpm on air pressure of 90 lb.

Circle 47 on postcard for more data



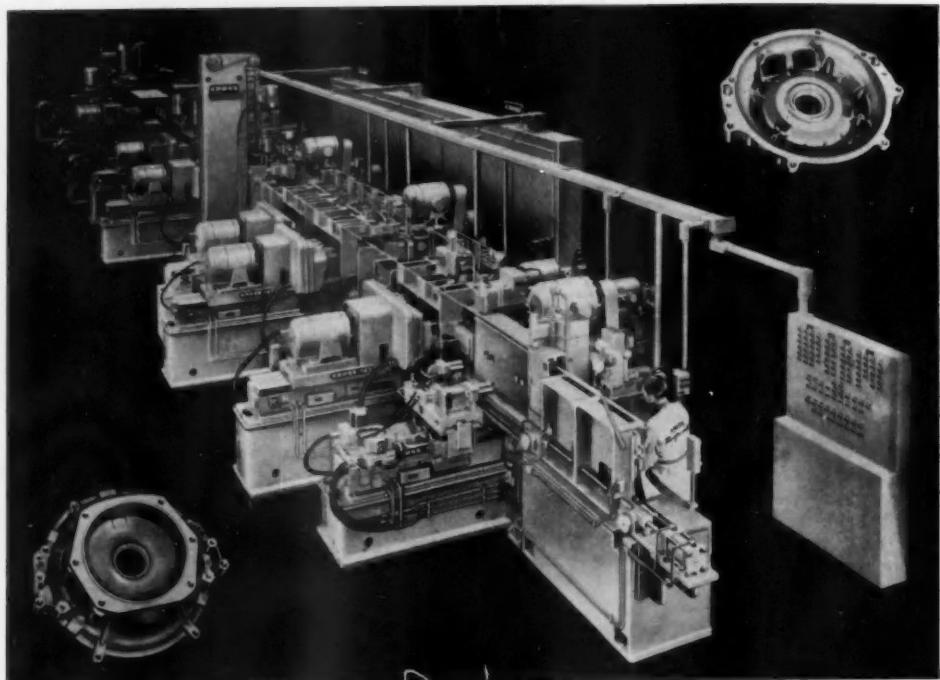
## Machine Tool SECTION

### CROSS CO.

#### TRANSFER MACHINE

*This 20-station machine processes at the same time two types of flywheel assemblies for different engines. Combining machining and assembling, it roughs and finish turns and faces the engine and transmission mounting faces; drills, bores, chamfers, reams and taps all holes; assembles the center bearing and two dowels; finish bores the center bearing after assembly; and washes and dries the parts for final assembly. Production is 314 pieces per hour at 100 per cent efficiency.*

Circle 49 on postcard  
for more data



### MICHIGAN DRILL HEAD CO.

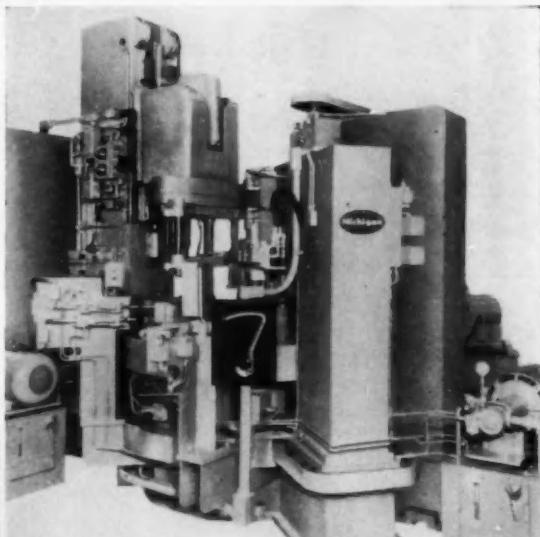
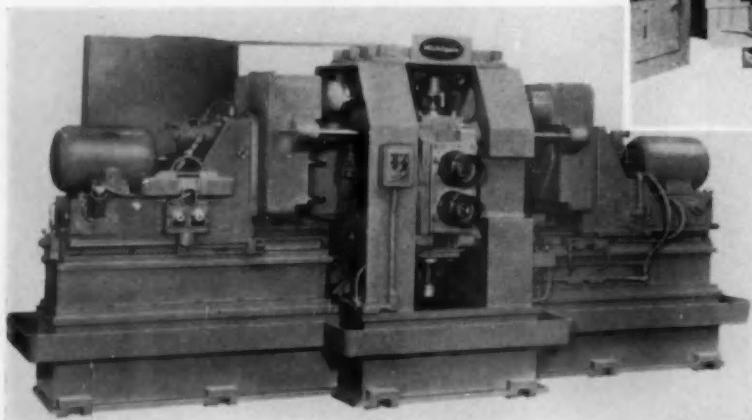
**BORING MACHINE**—Double-end, four-station, trunnion-type machine is designed to rough bore and semifinish bore compressor housings. Using carbide tools and feeding at the rate of 11 in. per minute, unit handles 420 housings per hour. Four-spindle, heavy-duty boring heads are mounted on each of two standard HC-10 units.

Circle 50 on postcard for more data

#### DRILLING MACHINE

*Horizontal - vertical dial - type machine drills, spotfaces, chamfers, finish reams, taps, and tests 120 brake pedals per hour. Standard components are assembled around a 42-in. automatic indexing table. The test detects fractured pedals and eliminates them from assembly line.*

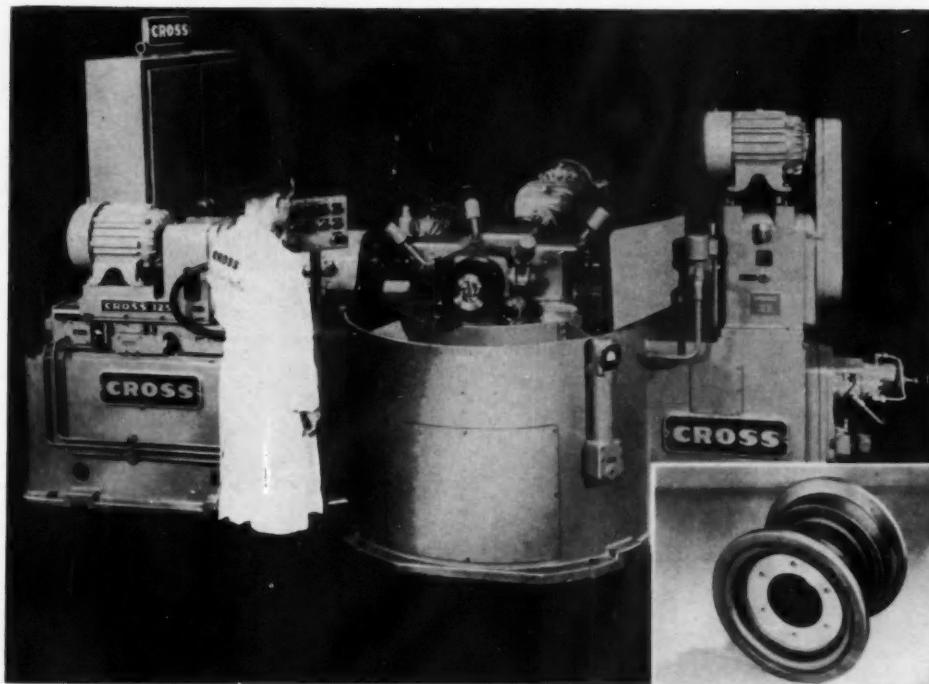
Circle 51 on postcard  
for more data



### MICHIGAN DRILL HEAD CO.

**MILLING MACHINE**—Three-column machine designed to finish mill three slotted lugs on clutch rings features three Hydro No. 3 vertical feed units in line on a single base and corresponding hydraulic index tables. Machine is automatic except for loading and unloading. Production is 360 rings per hour maximum.

Circle 52 on postcard for more data



#### CROSS CO.

**DRILLING MACHINE** — Dial-type machine incorporates a four station, power-operated index table for six holes on two sides of tractor wheels. Production is 54.5 pieces per hour at 100 per cent efficiency. Fluid motor drive is provided for indexing. The unit also has individual lead screw feed for tapping and gravity-operated cam clamping.

Circle 53 on postcard  
for more data

#### MODERN INDUSTRIAL ENGINEERING CO.

**DEBURRING MACHINE** — Model BME-14 Duplex simultaneously removes sharp edges on ends of gear teeth as well as burrs. Machine handles spur gears, helicals and straight sided as well as involute form splines from  $\frac{5}{8}$  to  $6\frac{1}{2}$  in. pitch diameter, at a production rate of up to five teeth per sec per side.

Circle 54 on postcard for more data

**OIL CUPS** — For replacement and plant maintenance purposes, the Lubrikits is a conveniently boxed assortment of 95 oil cups of 29 different types. These are the oilers most used for maintenance and replacement throughout industry, as shown con-

clusively by the company's sales records. Each type of oiler comes in its own separate bin within the kit. Contents of each bin are fully and clearly described on the inside of the cover.

Circle 55 on postcard for more data

#### GITS BROS. MFG. CO.



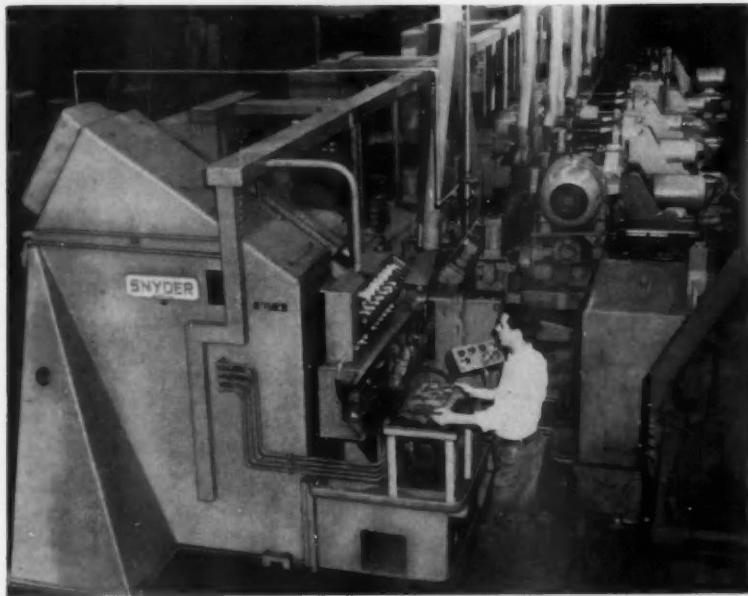
**GRINDING MACHINE** — Three-station machine deburrs and chamfers inside and outside edges of hypoid gear teeth; has production rate of 300 per hour. Machine can be adjusted to handle various sizes and types of gears. Two air-driven spindles mounting small grinding wheels are located at each station. One wheel chamfers the inside diameter, while the other simultaneously chamfers the outside diameter.

Circle 56 on postcard  
for more data

#### MODERN INDUSTRIAL ENGINEERING CO.



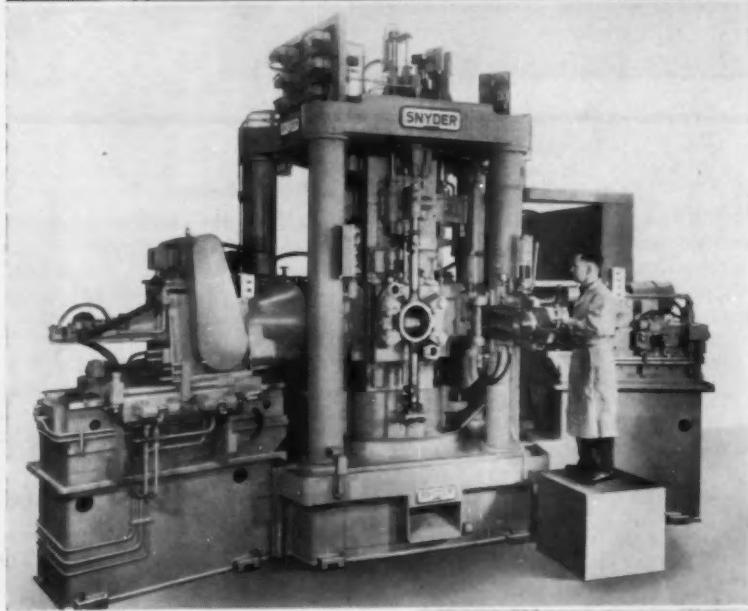
## Machine Tool SECTION



### SNYDER TOOL AND ENGINEERING CO.

**TRANSFER MACHINE**—Segmented transfer machine features a vertical angular rail arrangement to avoid turnover operations. The seven-segment, 20-station machine mills, drills, and taps 68 cast iron engine intake manifolds per hour at 80 per cent efficiency. Other features are: the use of individual control panels and hydraulic power units for each segment, and a master control panel.

Circle 57 on postcard for more data



**INDEXING MACHINE**—Floor space requirements are said to be reduced with a five-station vertical trunnion index machine designed for machining long parts such as axle housings. The hydraulically-operated, electrically-controlled machine rough and finish faces the housing banjo flange, drills and reams 10 holes in the flange mounting face, and chamfers both sides of the holes. It produces 105 housings per hour at 100 per cent efficiency.

Circle 58 on postcard for more data

**BORING MACHINE**—Eight-spindle, two-way precision machine has two fixtures that enable the boring of up to four holes at each fixture location, and the production of a finished part with each cycle of the machine. Each two-spindle boring head is a separate slide unit. A 3-hp motor drives the two spindles in each head; two speeds can be had on the lower spindle; and 3 speeds are obtainable on the upper spindle by adjusting belts.

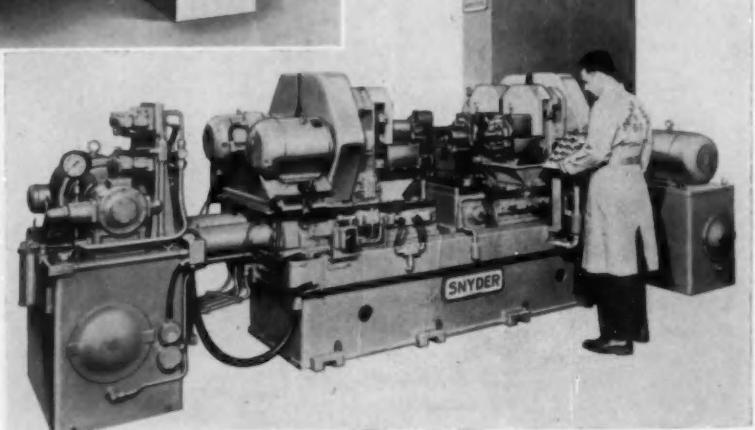
Circle 59 on postcard for more data



### THOR POWER TOOL CO.

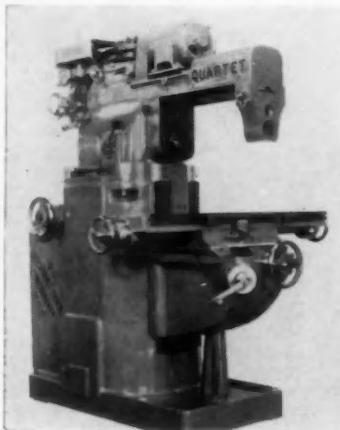
**AIR GRINDER**—Model 5V features an adjustable positive speed governor, built-in exhaust muffler, automatic mist oiling, double-row, preloaded spindle bearings and hardened steel center plates. Available in speeds of 4500, 6000, and 8000 rpm. Extra equipment and accessories will convert tool from a vertical cup grinder to a sander, wire brush machine, or depressed center, disk-wheel, cutoff grinder.

Circle 60 on postcard for more data



#### U. S. BURKE MACHINE TOOL DIV.

MILLING MACHINE—The Quartet is a horizontal universal knee type unit which may be used for horizontal, universal, vertical or angular



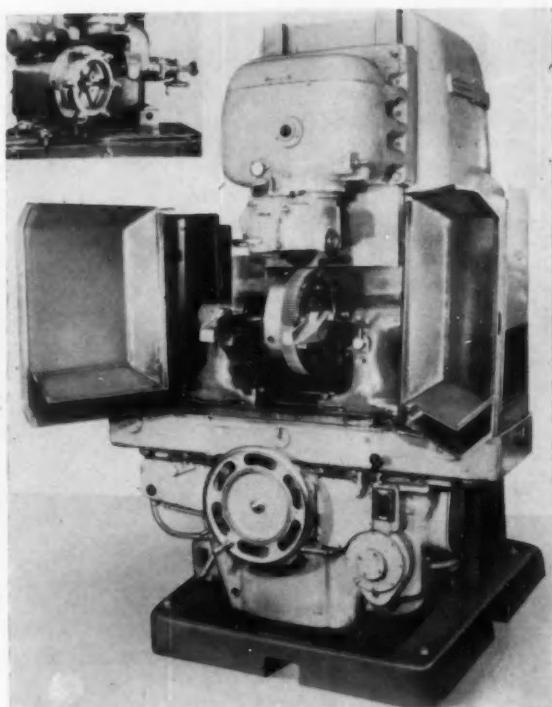
milling operations. It is equipped with a turret which may be swiveled to accommodate the machine to universal milling operations. At the rear of the rectangular type overarm is mounted an independently-driven vertical milling head, with power feed to the quill. For vertical and angular milling, the vertical head is indexed into position over the table.

Circle 61 on postcard for more data

#### NATIONAL BROACH & MACHINE CO.

GEAR SHAVER—Improved Red Ring Model GCP-24-in. will shave external gears from 3-in. to 24-in. pitch diameter in the 2 to 16 diametral pitch range; and internal gears from 6-in. to 24-in. pitch diameter in the same tooth size range. Swivel work head and internal cutter head attachments are provided when internal gears are shaved on the machine (see inset).

Circle 62 on postcard for more data



#### EX-CELL-O CORP.

TOOL SHARPENER — Style 43 sharpener is designed primarily for off-hand sharpening of single-point

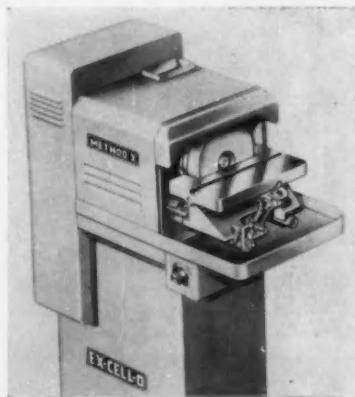
solid carbide and carbide-tipped tools. Machine has a ten-in. cast-iron disk, connected to serve as the negative terminal of an electric circuit. A



#### NATIONAL BROACH & MACHINE CO.

GEAR SHAVER—Model PSA-4-in. Red Ring planetary gear shaving machine produces thin-tooth sections in the flanks of spur gear teeth. A hardened and ground HSS cutter with single cutting edges alternately thins first one side of all the teeth, then the other. A timed relationship is maintained between the gear and the cutter.

Circle 63 on postcard for more data



semi-solid dielectric film applied to the disk provides a spark gap of proper distance. Current pulsations released as spark discharges overcome tensile strength of material. Rough or finish cuts can be obtained by simply setting a power selector switch.

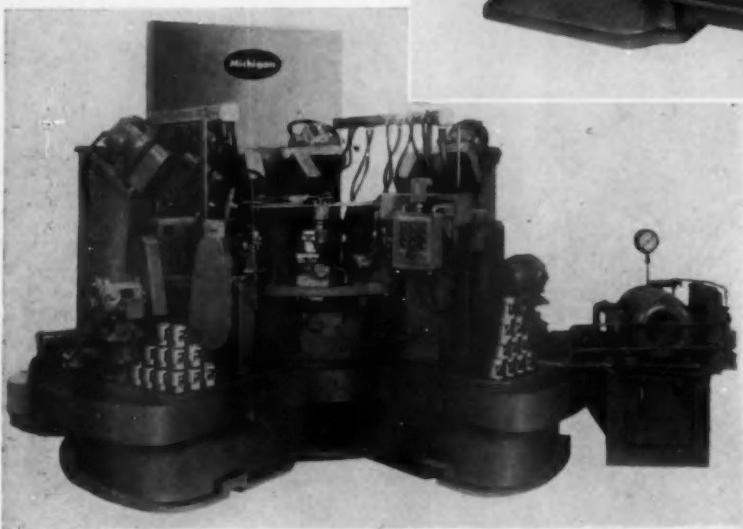
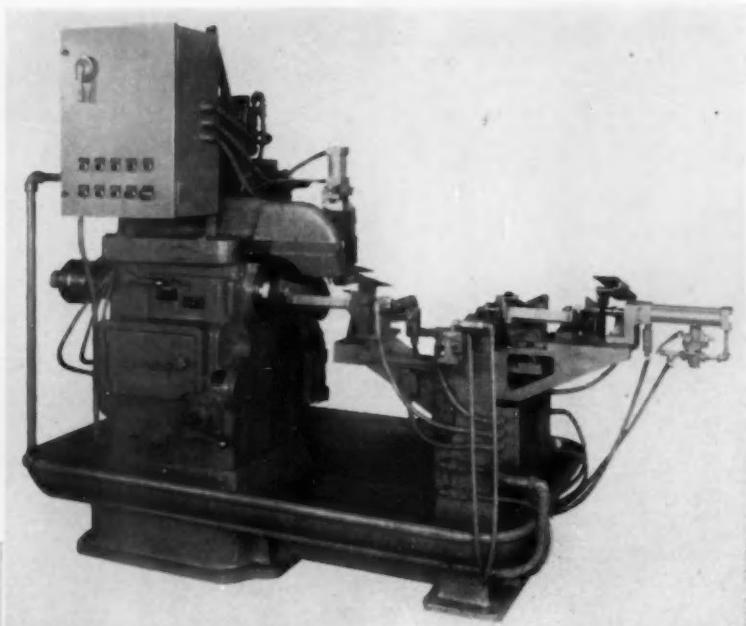
Circle 64 on postcard for more data

## Machine Tool SECTION

### SENECA FALLS MACHINE CO.

LATHE—Model LN automatic lathe is equipped with standardized units comprising a pedestal base, a combined headstock and feed works unit, a headstock turner slide, and a packaged automatic loader and ejector mechanism for specialized production. Requirements called for removal of a welding flash on a worm shaft assembly at a high production rate. While the entire loading, machining and unloading operations are automatic, pushbutton controls are installed for the manual operation of each movement. Rate of production is said to be 275 pieces per hour.

Circle 65 on postcard for more data



### MICHIGAN DRILL HEAD CO.

MILLING, DRILLING—Three-way, horizontal and vertical, milling, drilling and tapping machine handles 70 lb transmission housings at a production rate of 50 per hour at 100 per cent efficiency. The three-position indexing fixture, mounted on a standard six-station automatic indexing table, positions the part so that all machining operations are performed in either a vertical or horizontal position. Power clamping is incorporated.

Circle 66 on postcard for more data

### MICHIGAN DRILL HEAD CO.

DRILLING MACHINE—Eight-station, horizontal and angular, dial-type machine finish drills 1200 pistons per hour. Featured are an automatic hydraulic index table and individual automatic indexing fixtures, which make it possible to drill angular holes as well as horizontal smoke holes on the same machine.

Circle 67 on postcard for more data



#### MICHIGAN TOOL CO.

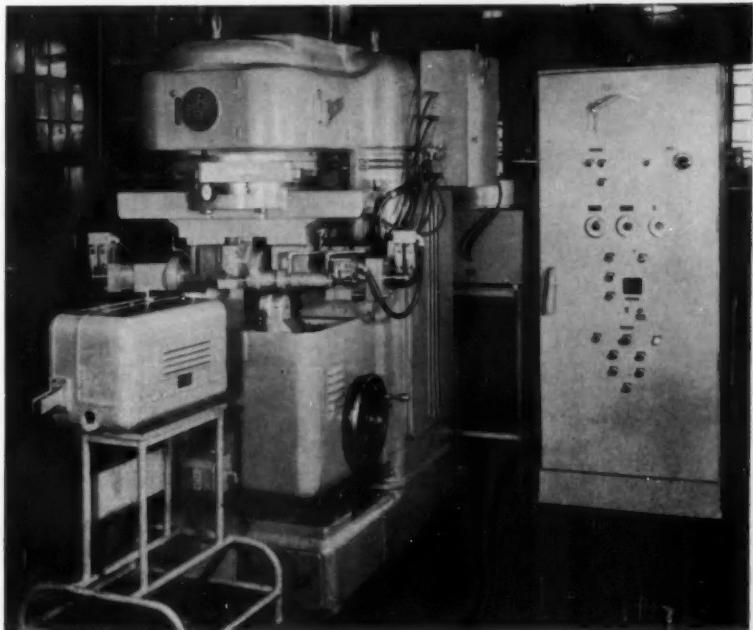
GEAR SHAVER — Gear - O - Mation equipped machine finishes automotive pinions at a rate of 260 per hour. Machine consists of an underpass gear shaver with vibrating hopper feed, automatic loading, a three-way probe-type gear classifier and control panel. Stock removed in shaving operation is 0.004 to 0.006 in. The 18-tooth pinion with a 15½ normal pitch has a left-hand helix angle of 22 deg, 11 min, 30 sec; face width of 1½ in.; and OD of 1.1419 in. Bore diameter is 0.6876 to 0.6881 in.

Circle 68 on postcard for more data

#### MOLINE TOOL CO.

DRILLING MACHINE—Model HU 110 universal joint type hydraulic feed driller has 24 adjustable center spindles with 1-in. drill capacity in steel and 1½-in. minimum centers. Each spindle driver has two-speed and neutral adjustment. The machine has a 15 by 24-in. drilling area, and an automatic feed cycle with push button control.

Circle 69 on postcard for more data



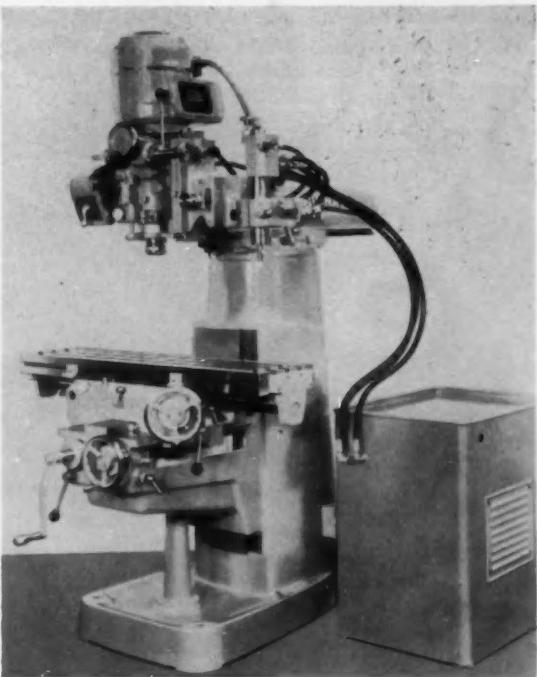
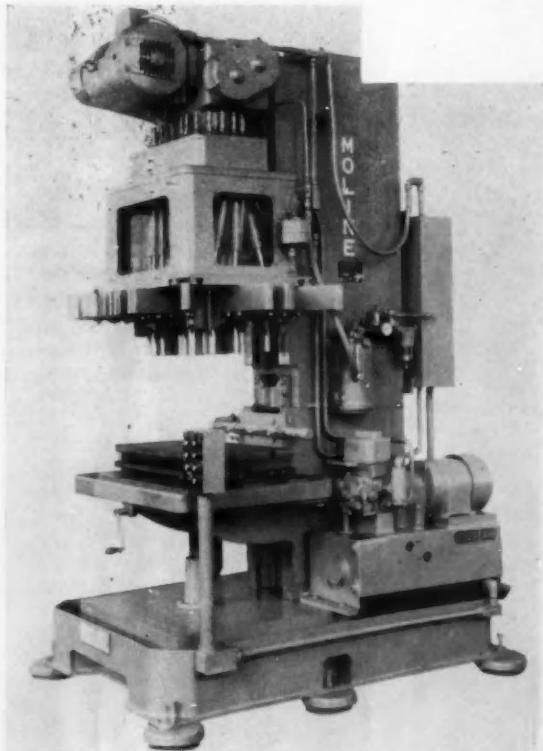
#### CINCINNATI MILLING MACHINE CO.

MILLING MACHINE—Contourmaster milling machines are designed for production of small contoured shapes, such as molds and dies, hobs, etc. Style 1B, illustrated, has 22-in. table travel, hydraulic

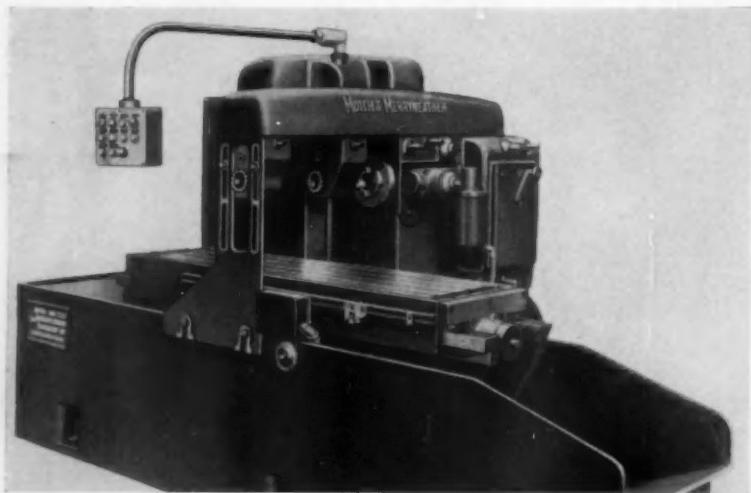
depth control tracer, dual hand controls for the quill. Truncated column provides swivel mount for cross sliding ram, which has shaping attachment on rear. Attachments include automatic duplex ro-

tary table adjustment, automatic table cycle, hand pickfeed to saddle, reverse image attachment.

Circle 70 on postcard for more data



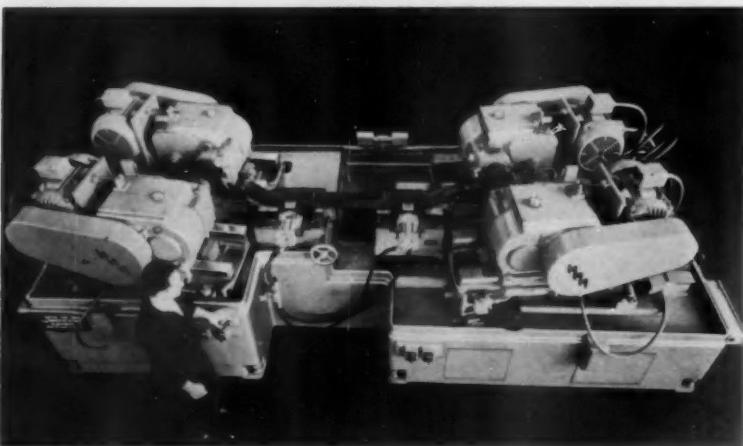
## Machine Tool SECTION



### MOTCH & MERRYWEATHER MACHINERY CO.

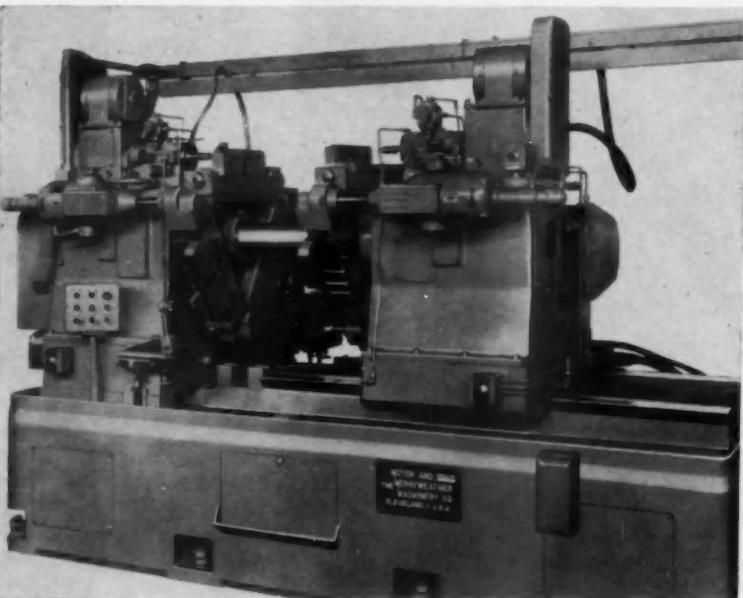
**MILLING MACHINE**—In a line of plain and duplex models of a bed-type milling machine is a plain model featuring a 25-hp motor giving spindle speeds from 25 to 1230 rpm through change gears. Table feeds are one to 81 ipm, rapid traverse is 243 ipm. Optional equipment includes power head feed for automatic rise and fall.

Circle 71 on postcard for more data



**MILLING MACHINE**—A double duplex miller incorporates two pairs of opposed heads that simultaneously mill the kingpin bosses of forged steel axles. Two surfaces on each end of the front axle are face-milled in relation to the mounting surfaces. The cycle consists of rapid traverse of the four milling heads to milling position, feed of the four heads simultaneously across the surfaces to be milled, stop, rapid traverse return to the starting position, and fixture unclamping. All machine movements are automatic, except for loading and unloading the part.

Circle 72 on postcard for more data



**MILLING, CENTERING MACHINE**—Model MCT-3 can be set up for lengths to 48-in., and drills to a depth up to 4-in. Two triangular fixtures with six trunnion vises index 120-deg between three stations. The three operations—load-unload, mill and center drill—are handled in an automatic cycle.

Circle 73 on postcard for more data

### CINCINNATI LATHE & TOOL CO.

**DRILL PRESS** — Royal Model LE drilling machine is rated at one-in. capacity in cast iron with a one-hp motor, and is equipped with a No. 2



or No. 3 Morse taper spindle. Single spindle floor models, and single and multiple spindle bench models are offered. Six spindle speeds are provided, ranging 390 to 3100 with an 1800-rpm motor; 324 to 2580 with a 1500-rpm motor; 259 to 2060 with a 1200-rpm motor; or 216 to 1715 with a 1000-rpm motor. A direct-reading depth dial incorporates a positive stop. Also available at extra cost is a geared power feed.

**Circle 74 on postcard for more data**

#### MONARCH MACHINE TOOL CO.

**LATHE** — Model 21 Mona-Matic is equipped with a constant surface cutting speed mechanism. Functioning in conjunction with the multi-cycle programmer-controlled four-cut fully-automatic work cycle, the mechanism is said to provide automatic variation of the drive motor speed to maintain the desired surface cutting speed on each of the various diameters and contours of workpiece in the run. Available surface speeds range from 200 to 1175 fpm and can be maintained over a four to one diameter range.

**Circle 75 on postcard for more data**

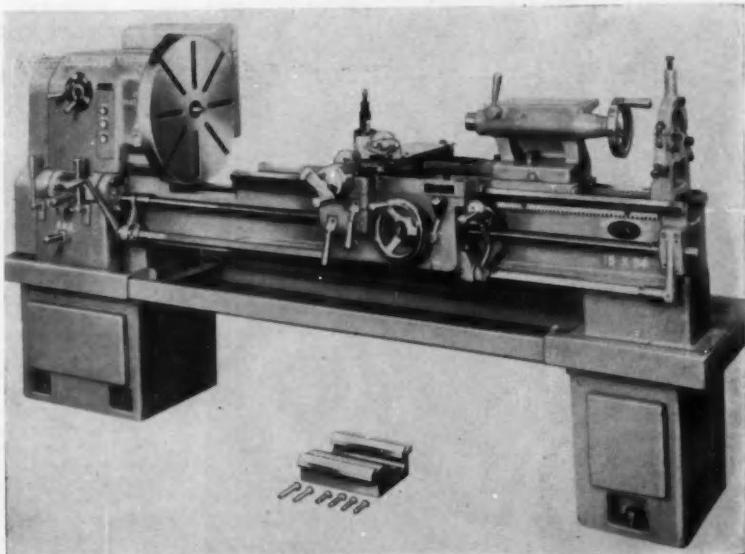
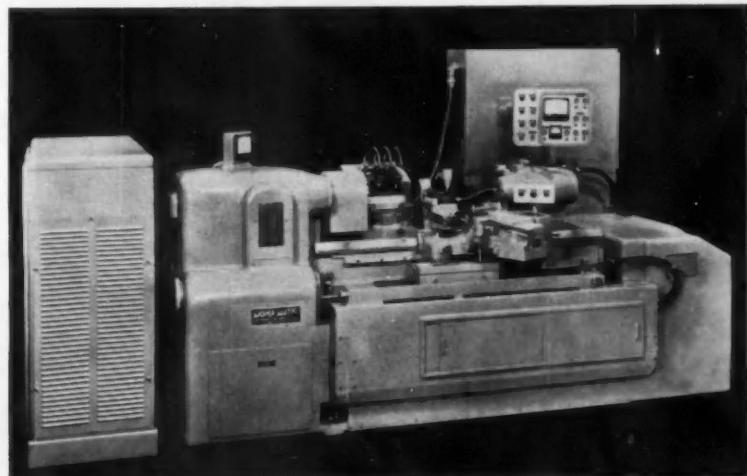
#### CINCINNATI GRINDERS, INC.

**GRINDING MACHINE** — Filmatic 6-in. by 18-in. plain hydraulic grinder has automatic push-button infeed and electric gage sizing, as well as automatic headstock and cutting fluid control. Power table traverse, hydraulically-operated, provides infinitely variable traverse rates from three ipm to more than 200 ipm. Length of table traverse may be automatically controlled from the full rated stroke to as short as 3/32-in. Four spindle speeds are available, selected by means of vee belt, ranging from approximately 100 to 300 rpm.

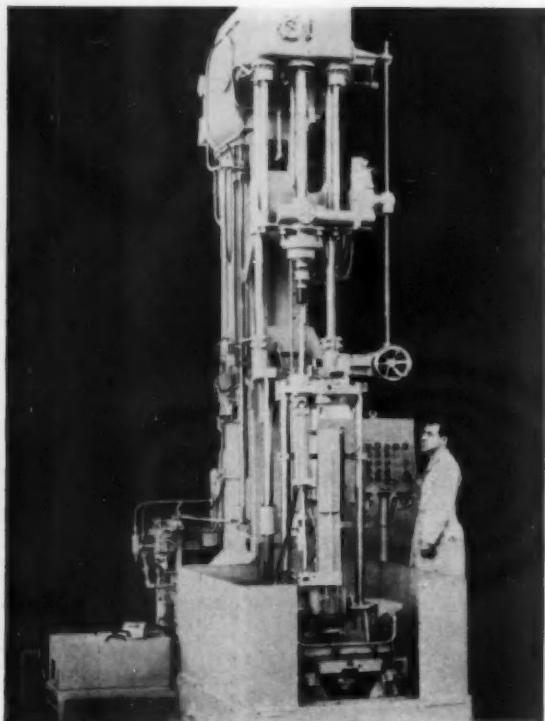
**Circle 76 on postcard for more data**

**LATHES** — Model LE fixed gap bed lathes are available in 15-in., 18-in., 21½-in. and 26-in. sizes. Oversize workpieces may be accommodated by removal of the gap block, which increases swing size to 22-in., 27-in., 32-in., and 37-in., respectively. They have 12 spindle speeds in geometric progression, with a three-lever, direct-reading shift mechanism. Forty-eight thread and feed changes on the 15-in. and 18-in. lathes, and 54 thread and feed changes on the 21½ and 26-in. lathes are obtained through a quick-change gear box.

**Circle 77 on postcard for more data**



## Machine Tool SECTION



### HEALD MACHINE CO.

**BORING MACHINE**—Vertical Bore - Matic two-station machine has feed controls for rapid traverse boring, turning, facing and related boring operations. Continuous production can be maintained by loading one station while the other is boring, since each station

may be independently operated. Machine is adaptable to wide range of parts, including flywheels, impellers, bell housings, and clutch plates, and it can handle parts up to 16-in. diam. (See below)

Circle 79 on postcard  
for more data



### THE NATIONAL ACME CO.

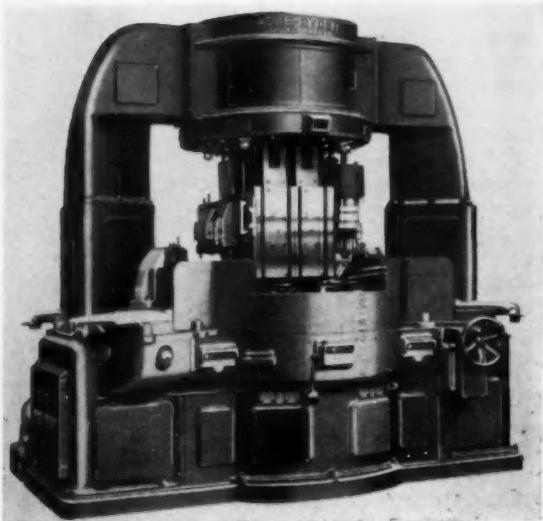
**VERTICAL CHUCKER**—This 14-in. Acme-Ryder vertical hydraulic chucking automatic is arranged for double indexing, with two loading stations. It is an eight-spindle model equipped with 14-in. capacity chucks, eight turning slides and four cross slides. In addition, four "auto cross slides"

Circle 80 on postcard for more data

### WICKMAN PRODUCTS CORP.

**PROFILE MILLER**—Tracemaster is a fully automatic machine which can be used for three-dimensional copy-milling of dies, rubber and glass molds, turbine blades, and workpieces of irregular shape. The Hydratrace copying valve controls the speed of table traverse. It is said to provide a constant rate of feed relative to the form being copied, and to allow cavities with vertical faces to be copied automatically. Cutters up to  $\frac{1}{2}$ -in. diam can be used on the machine. It has automatic infinitely-variable cross feeds of .0005 to .250-in.

Circle 81 on postcard  
for more data



### MICROMATIC HONE CORP.

**HONING MACHINE**—Model 450 Hydro-honer, designed for internal and external microhoning, has a maximum 50-in. hydraulic head stroke

and a work diameter capacity of 15 in. Machine is equipped with eight-speed transmission, variable delivery hydraulic pump and tank unit and controls, and a safety interlock to hold the head in the up position.

Circle 78 on postcard  
for more data



#### **ROCKFORD MACHINE TOOL CO.**

**SHAPER-PLANER** — Openside hydraulic shaper-planer is built in 30 by 24, 30 by 30, 36 by 36, and 36 by 42-in. table sizes with stroke lengths from six to 20 ft. Three cutting ranges are provided. Infinite speeds range from 10 to 300 fpm, with maximum return speed regardless of cutting speed. For convenience when finish planing with a broad nose tool, maximum cross feed and vertical feed to all heads is 0.500-in.

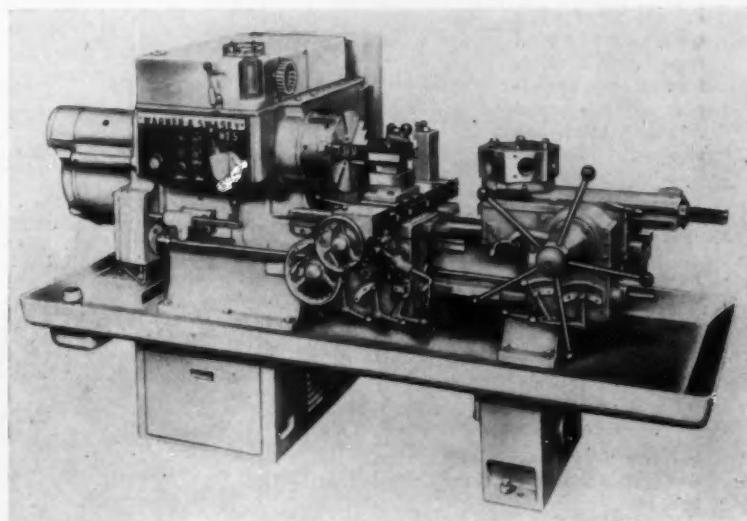
Circle 82 on postcard for more data



#### **WARNER & SWASEY CO.**

**TURRET LATHES**—Simplified operating controls and faster speed changing through the use of an all-hydraulic headstock are among the design features of two universal ram type turret lathes. Designated No. 4 and No. 5, both machines are said to be adaptable to existing tooling as well as the latest in special turret lathe attachments. Twelve spindle speeds, or 24 unduplicated spindle speeds with a two-speed motor, in a 62.2 to 1 overall range, are standard on both models. The No. 4 lathe swings 18½ in. over the bed and 9½ in. over the cross slide; while the larger No. 5 machine swings 20 in. over the bed and 10½ in. over the cross slide.

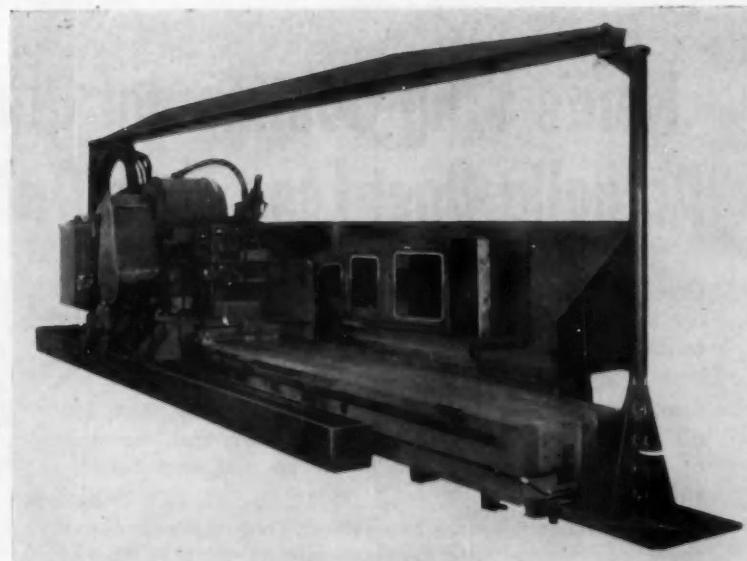
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#### **MATTISON MACHINE WORKS**

**GRINDING MACHINE**—UK traveling wheel face grinder handles long or bulky workpieces at 90 deg to the wheel face. A servo mechanism completely controls all machine functions. Rate of speed, start, stop, inching, and positioning for unloading are controlled by pushbuttons from operator's seat on traveling wheel carriage. Range of carriage speed is from 10 to 100 fpm.

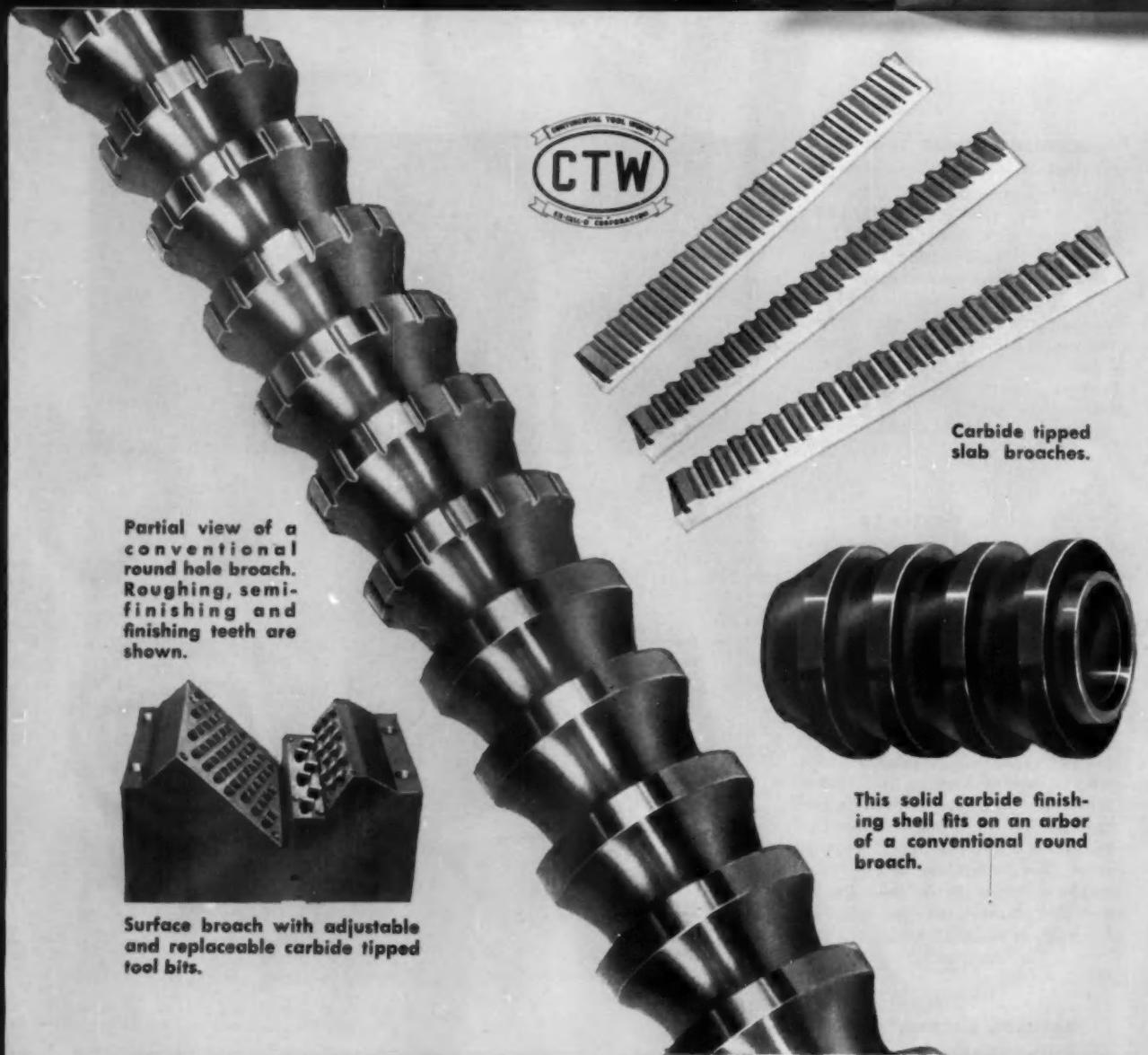
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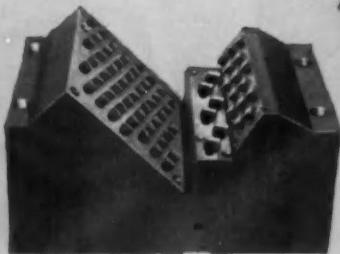
#### **AUTOMOTIVE INDUSTRIES . . .**

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**MANUFACTURING**



Partial view of a conventional round hole broach. Roughing, semi-finishing and finishing teeth are shown.



Surface broach with adjustable and replaceable carbide tipped tool bits.

This solid carbide finishing shell fits on an arbor of a conventional round broach.

## Here's Why Continental Quality Broaches Actually Cost Less Than Ordinary Broaches

Continental's experience in designing and manufacturing has broadened the use of broaching and has brought its advantages to applications that were normally considered impractical.

Continental engineers are tool specialists. Every tooth of a Continental broach is an effective cutting tool because of quality materials, skilled craftsmen and engineering experience.

Continental broaches are free cutting, hold required tolerances and finishes with maximum pieces per tool. That's why many manufacturers have learned to agree with Continental—the best broaches cost less.

**Continental**  
**TOOL WORKS**

Division of  
Ex-Cell-O Corporation  
Detroit 32, Michigan



## Ransburg Electrostatic Processes

Whether it be painting of automobile bodies —(in one case, saving \$1.81 per body)—or painting smaller automotive parts, RANSBURG ELECTROSTATIC PROCESSES are accounting for substantial savings to the manufacturer, and to the buying public. An accumulated savings amounting to several dollars per car!

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SEAT FRAMES • TAIL PIPES • VENTILATOR PARTS • JACKS • ENGINES • HORNS  
HEATERS • CARBURETORS • STEERING COLUMNS • TRIM • LAMP PARTS  
AIR FILTERS • OIL FILTERS • SHOCK ABSORBERS • RADIOS • HARDWARE  
STEERING WHEELS • STEERING CASTINGS • TIE RODS • RADIATORS  
DRY BATTERY PARTS • BUMPER BRACKETS • CONVERTIBLE TOP PARTS  
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WHAT DOES IT COST TO USE RANSBURG ELECTROSTATIC PROCESSES? It doesn't COST! It SAVES! Let us show you how Ransburg Electro-Spray can cut your painting costs and provide higher quality work in YOUR finishing department.

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RANSBURG

# Precision Tooling

shortest route  
to COST  
REDUCTION



**P & W**

## KELLER MACHINES

Producing an almost limitless variety of dies, molds, prototypes and other work, these automatic, tracer-controlled millers accurately reproduce the shape of any 2-dimensional template or 3-dimensional full model. Complex forms that cannot be machined economically — or at all — by other methods are produced quickly and easily by "Kellering."

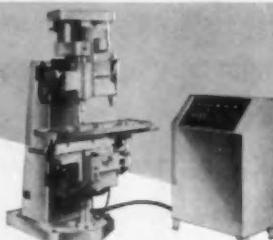
## PRATT & WHITNEY COMPANY, INCORPORATED

MACHINE TOOLS • GAGES • CUTTING TOOLS



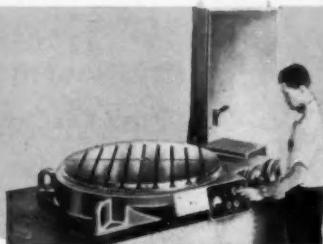
### 2E VERTICAL PRECISION HOLE GRINDER

"Tenths" accuracy plus grinding speeds to 100,000 rpm.



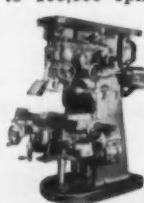
### "VELVETRACE" MILLING MACHINE

Ultimate in accuracy for 3-dimensional tracer-controlled reproduction.



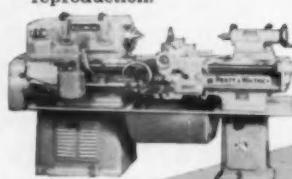
### PRECISION ROTARY TABLES

Rugged, accurate to seconds! Automatic, plain, tilting and vertical types; 10" to 50" diameters.



### PLAIN AND UNIVERSAL DIE SINKERS

Extra power and stamina to handle today's tougher die steels with speed, accuracy.



### MODEL C LATHES

Traditionally the finest wherever highest precision is essential . . . now even better.



### CUTTER and RADIUS GRINDERS

Grinds virtually every type of standard and special cutter . . . quickly and accurately.

To meet today's standards for quality and performance . . . and to compete profitably on today's markets . . . your products must be manufactured with a greater degree of precision than ever before. The only sound, economical way to meet these high standards is to build precision into your products where production starts . . . in your tool room with Pratt & Whitney Machine Tools . . . your assurance always of the finest, the most accurate.



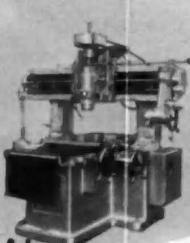
## P & W

### JIG BORERS

Locating, boring and checking to .0002 of an inch, P&W Jig Borers are primarily designed to bring new standards of dependable accuracy to the manufacture of basic production tools such as jigs, fixtures, dies, molds, etc. However, unequalled speed and ease of operation have led to widespread use for precision small-lot production; for fast, accurate inspection work; and for a variety of precision machining jobs where other types of machines would require complicated jigs and fixtures.

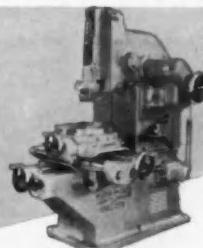
### WEST HARTFORD, CONNECTICUT

*Direct Factory Representatives in Principal Cities*



#### VERTICAL MILLERS AND PROFILERS

Economical production profiling of irregular shaped parts.



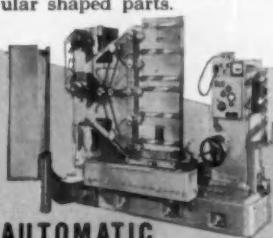
#### VERTICAL SHAPERS

Handiest machine in any shop for fast, accurate handling of irregular shaped work.



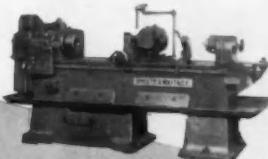
#### DIAFORM WHEEL FORMING ATTACHMENTS

Form-trues grinding wheels, accurate to "tenths" in minutes; saves time, money.



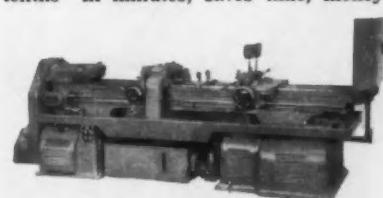
#### AUTOMATIC DUPLICATING MACHINES

Duplicates die and bottle mold sections . . . quickly, accurately, economically.



#### MODEL C THREAD MILLERS

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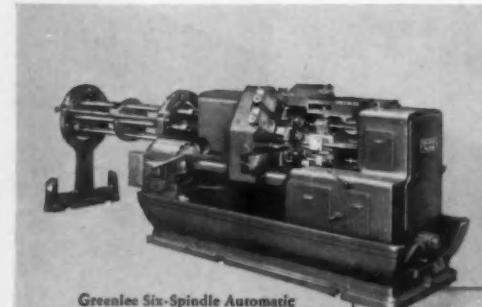


#### DEEP HOLE DRILLERS

Twin drilling units produce true holes up to 129" deep in a single, uninterrupted operation.

Extra power and stamina to handle today's tougher die steels with speed, accuracy.

... now even better.



Greenlee Six-Spindle Automatic Bar Machine.



Greenlee 22-Station Automatic Transfer Machine for machining transmission cases.



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Greenlee creative thinking, Greenlee engineering and Greenlee experience combined with that of your own engineers will help you "produce more at lower cost."

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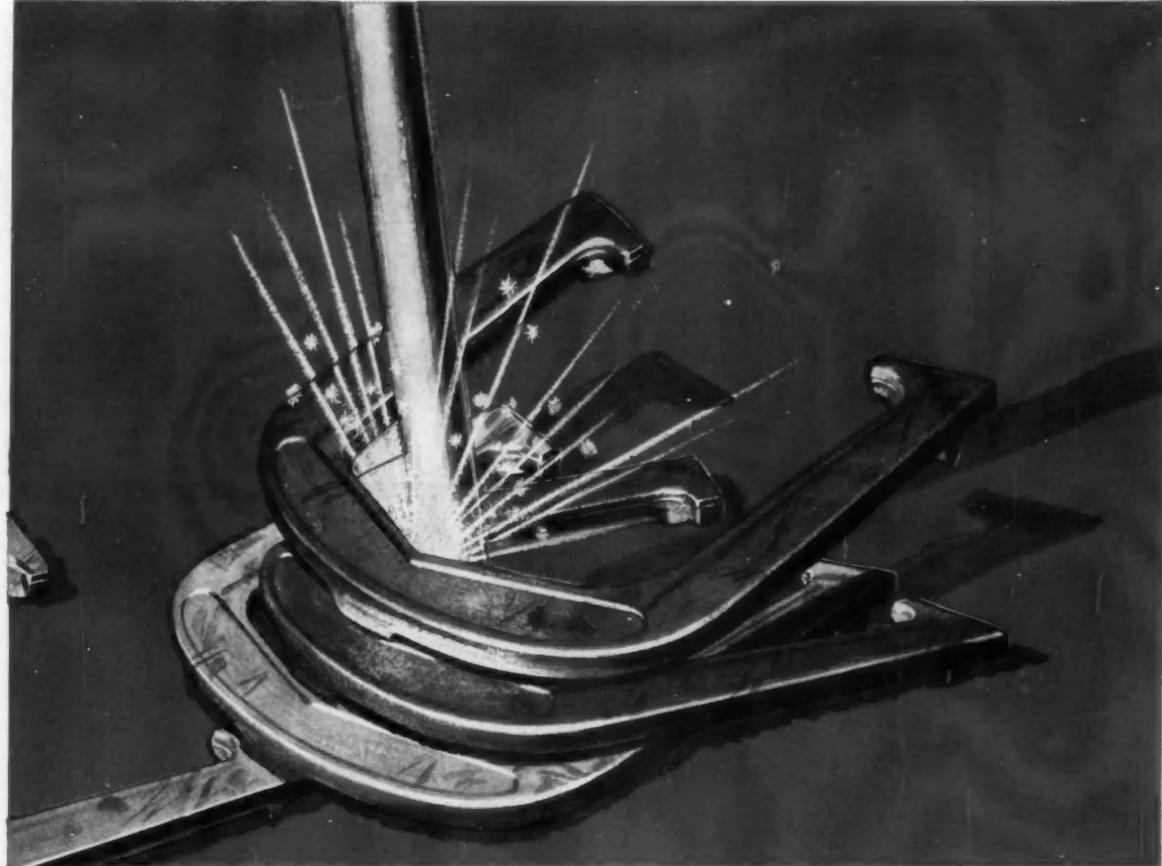
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economically.

new standards for accuracy, finish and economy.

rupted operation.



**"Finish first in your league"**

**...with J&L COLD FINISHED JALCASE STEELS**

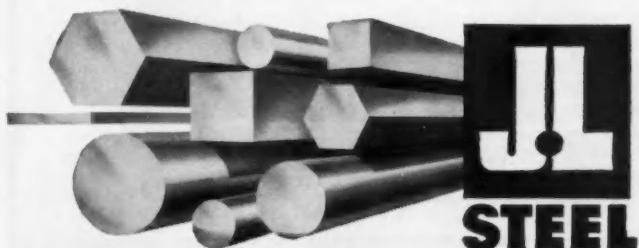
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## CYLINDRICAL GRINDERS



**10" Type CTU and 14" Type LCTU.** Semi-automatic or plain. For plunge or traverse operations, from roughing cuts to finest finishing. Can take a wide range of multi-wheel mounts. In production line and job shop work these machines have doubled production, replaced several machines, eliminated extra operations. *Catalog No. 1787*



**10" Type CV-4 and 14" Type LCV-4 Angular Wheel Slide.** Semiautomatic machines that grind thrust surfaces and adjacent diameters in one fast, automatic plunge operation. They leave a concentric grain pattern in the thrust surface finish, assuring a better seal surface and appearance. *Catalog No. 1658*



**Type CM-1 Heavy Duty Multi-Wheel.** Semiautomatic. Makes four or more cuts simultaneously, in a single plunge-grind cycle. Brings new speed, accuracy and economy to the grinding of multi-diameter parts. Many automatic features, including one-lever control. *Catalog No. 1550*

## ROLL GRINDERS



**Type C-2.** A heavy duty machine, featuring faster cutting, quicker set-ups, easier operation. Available as a plain, semiautomatic or roll grinder. One-lever control of grinding cycle on the semiautomatic. As a roll grinder it includes the famous Norton tilting wheel head. *Catalog No. 1827*

## CAM GRINDERS



**NO. 3 CAM-O-MATIC\* Cam Grinder.** An automatic, hydraulic machine that is setting new standards for production, precision and finish. Grinds all cams and the camshaft eccentric successively and automatically, in one handling. Entire operation geared to split-second efficiency. *Catalog No. 191*

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In building the world's largest line of grinders and lappers — including automatic machines and machines for specialized operations — Norton offers you the greatest opportunities to modernize.

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Ask your Norton representative for the literature you want, or write direct. And remember: only Norton brings you such long experience in both grinding machines and grinding wheels — to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

## CRANKPIN GRINDERS



**Automatic Transfer Type.** For completely automatic crankpin grinding — a news-making Norton "first." Locates, grinds, gages, transfers—all automatically—cutting costs on each crankshaft ground. Typical of Norton's rapid progress in automatic operation. *Catalog No. 1837*

## CUTTER AND TOOL GRINDERS

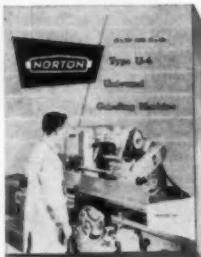


**No. 20 Cutter And Tool Grinder.** Fastest, most versatile machine in its class. Wheel head tilts 15° above or below horizontal and swivels through 360°, simplifying many difficult grinding jobs. Easy to set up, operate and maintain. *Catalog No. 189*



**No. 2 BURA-WAY\* Tool Grinder.** Unequalled for grinding convex single point and form tools. Generates, produces and maintains relief angles constant in the direction of the feed. Duplicates the master tool form exactly. Extends the life of carbide-tipped and other tools. *Catalog No. 220*

## UNIVERSAL GRINDERS



**Type U-4, 12" x 36" and 12" x 48".** Quick, easy set-ups plus fast grinding action save time and costs on a wide variety of external, internal, face and angular wheel-slide jobs. Simply turning a dial gives an infinite number of work speeds over its 40 to 400 rpm range. *Catalog No. 231*

## LAPPERS



**HYPROLAP\* Lapping Machine No. 48F.** An extremely fast, high production machine for single or parallel face flat lapping. Bonded abrasive laps produce work pieces free of grit. Three arrangements: plain, timed cycle; automatic continuous feed; semiautomatic continuous feed. *Catalog 1954*



**Vertical Lapping Machine No. 16FC.** Outstanding productive capacity for flat work up to 3 $\frac{1}{2}$ " x 5" and cylindrical work up to 3 $\frac{1}{2}$ " diameter. Can produce optically flat surfaces and diameter tolerances in millionths, with fine repetitive accuracy. *Catalog No. 212*.

## SURFACE GRINDERS



**8" x 24" Hydraulic.** Grinds plane surfaces speedily and economically, in large stock removal or close tolerance operations. Designed with both hand and hydraulic table cross feed. Convenient controls and easy accessibility reduce operating and maintenance time. *Catalog No. 190*

## SPECIAL GRINDERS

**42" Hi-Swing Semi-Automatic Chucking Grinder.** For rapid, accurate grinding of large diameter, short parts, such as jet engine compressor wheels and similar components. Takes work held by chucks, face plates or special fixtures and permits grinding several surfaces without disturbing the set-up. *Catalog No. 1780*.



\*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

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GRINDERS and LAPERS

Making better products...to make your products better

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# ALLISON TAKES ANOTHER IN POWER TRANSMISSION

*New "FourSpeed" TORQMATIC Drive boosts  
vastly increasing hauling ability both*



Built for the big jobs — that's the story behind the new Allison "FourSpeed" TORQMATIC DRIVE.

With its 350 horsepower rating, this TORQMATIC Converter-Transmission team has the brawn and heft to take the biggest loads and toughest hills, like a breeze.

**The TORQMATIC Converter provides silken smoothness during starts and speed changes — the automatic lock-up drive provides big fuel savings during extended runs, and speeds hauling cycles on every road over any terrain.**

This quick-shift TORQMATIC Transmission has the driving ease that makes the biggest off-highway trucks and scrapers handle like a driver's dream come true.

And with the built-in TORQMATIC Brake (optional), it's got a big extra margin of safety.

Many leading manufacturers of scrapers and off-highway trucks are planning to install this new "FourSpeed" TORQMATIC DRIVE to increase the performance standards of their equipment.

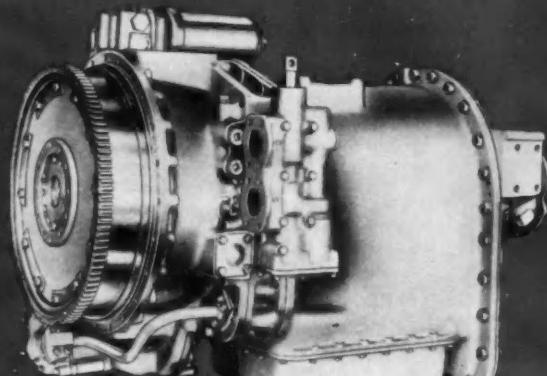
And the reason for the tremendous interest in this newest of all TORQMATIC DRIVES is simple.

*It's the only heavy-duty converter-transmission team with an automatic lock-up drive, quick-shift range selection and TORQMATIC Brake in one compact unit that is easy to install, free of troublesome piping and other miscellaneous accessories.*

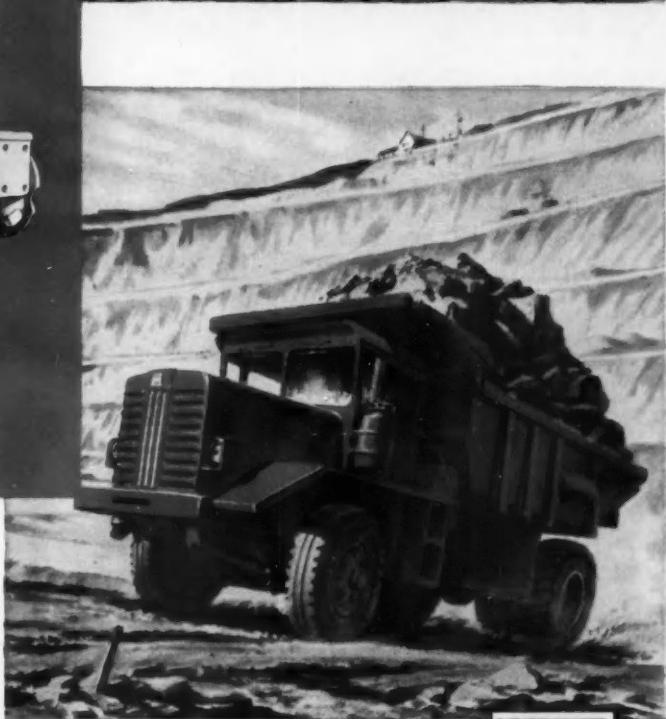
For full details on the great new Allison "FourSpeed" TORQMATIC DRIVE in the equipment you buy or build, write Allison Division of General Motors, Box 894A, Indianapolis 6, Indiana.

# GIANT STEP PROGRESS

*operating speeds,  
up-hill and down*



Model CBT-5640 Torqmatic Transmission  
Write for brochure.



*Allison*  
**TORQOMATIC DRIVES**



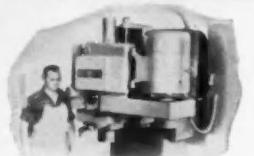
**From  
Elements  
Like These**

**Together with  
SUNDSTRAND  
"Engineered Production"**



**TRAVELING  
HEADS**

Self-contained units with ways for horizontal or angular travel.



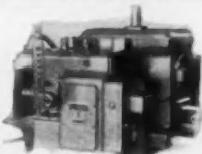
**VERTICAL OR  
HORIZONTAL HEADS**

Available in capacities from 3 to 100 H.P.



**ROTARY TABLES**

Available in several sizes for continuous or rotary milling operations.



**ADJUSTABLE COLUMNS**

Movable columns provide maximum cutting rigidity for horizontal heads over a wider range for milling both large and small work pieces.



**HORIZONTAL TABLES**

Available in widths from 10½" to 96" and feed strokes from 18" to 216".



**ALL ANGLE HEAD**

Available up to 25 H.P.



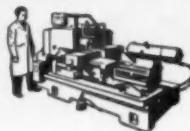
**...You'll get the  
exact machine  
for your  
requirements**

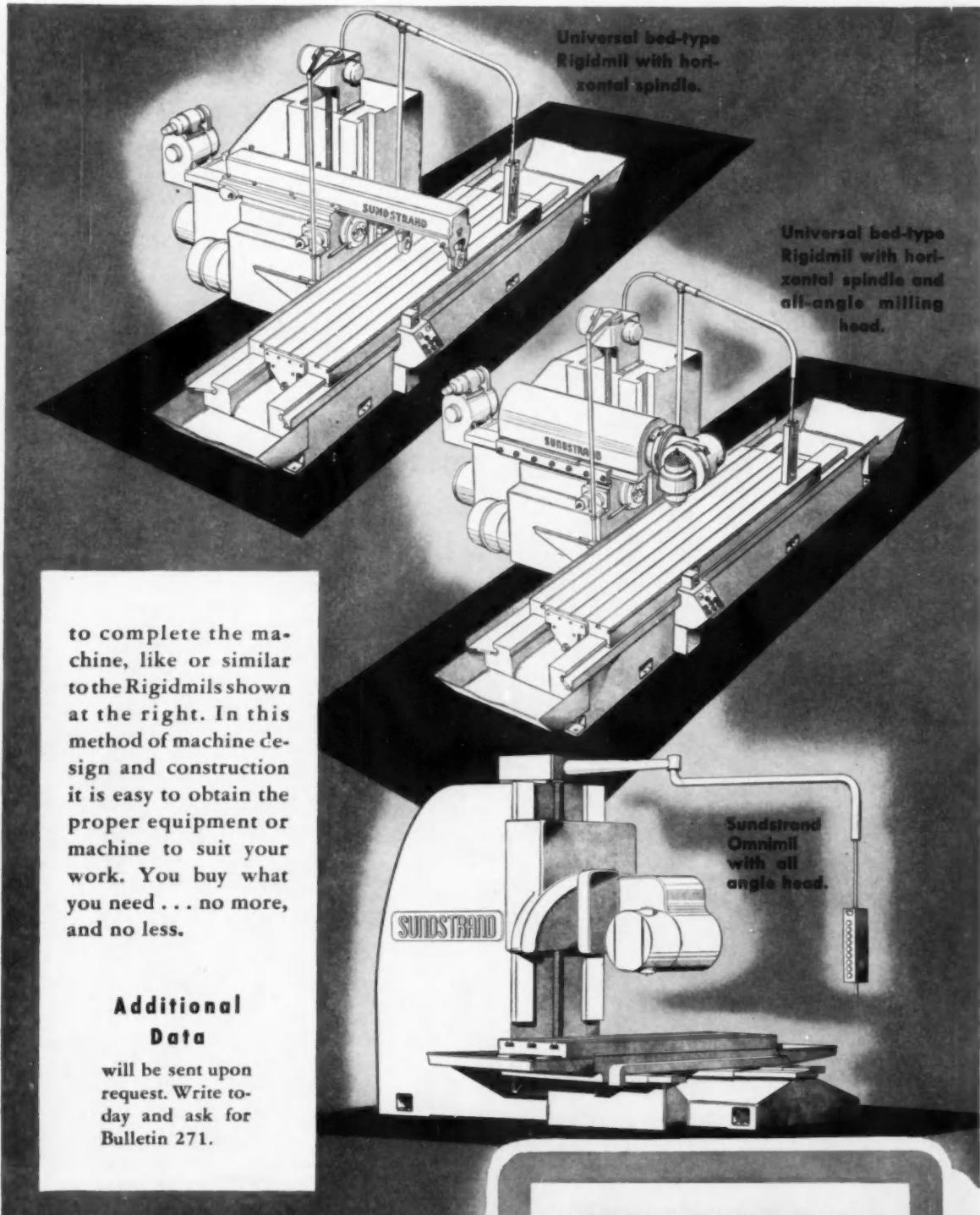
Sundstrand Rigidmils are built from standard machine elements as shown above. After the correct tooling for the job has been determined, the proper combination of machine elements is assembled



*"Engineered  
Production"  
Service\**

AUTOMATIC LATHES | SIMPLEX RIGIDMILS | DUPLEX RIGIDMILS





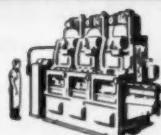
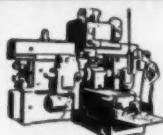
to complete the machine, like or similar to the Rigidmills shown at the right. In this method of machine design and construction it is easy to obtain the proper equipment or machine to suit your work. You buy what you need . . . no more, and no less.

#### Additional Data

will be sent upon request. Write today and ask for Bulletin 271.

TRIPLEX RIGIDMILS

SPECIAL MACHINES



**SUNDSTRAND**  
**Machine Tool Co.**

2571 Eleventh St. • Rockford, Ill., U.S.A.



*Whether -*

# TRACTORS

# PLANES

# or AUTOS---

Baush Automatic Machine Tools  
speed production and lower costs!!

Since their beginning the tractor, plane and automotive industries, which play such an important role in our modern-day life, have depended upon Baush to design and produce special purpose equipment to produce their machine parts better, faster and with less expense.

Whatever your machining problems might be our engineers can help you.

Why not send us your prints and specification requirements TODAY?

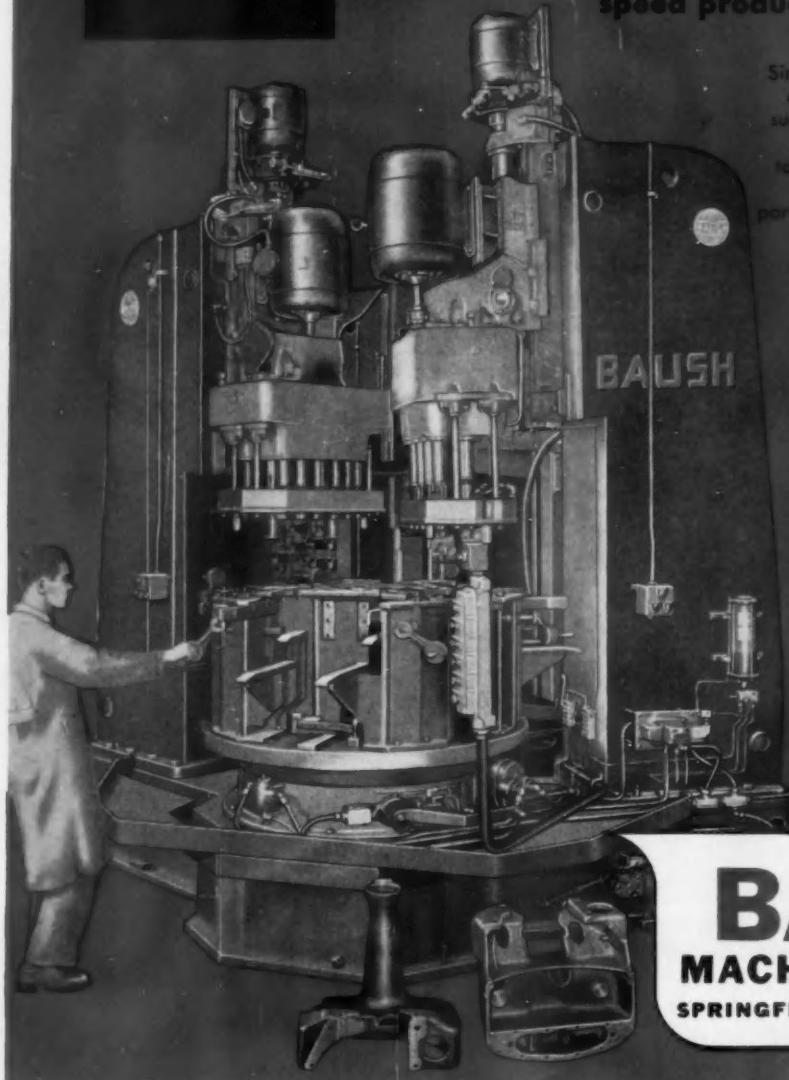
This Baush Dual Column Unit machine is equipped with a 50" diameter semi-automatic hydraulic rotary table with 3 stations, 3 holding fixtures, automatic lubrication and J.I.C. Controls.

There are two 7½ mechanical lead-screw units, one 14-spindle fixed center head, and one 12-spindle fixed center head.

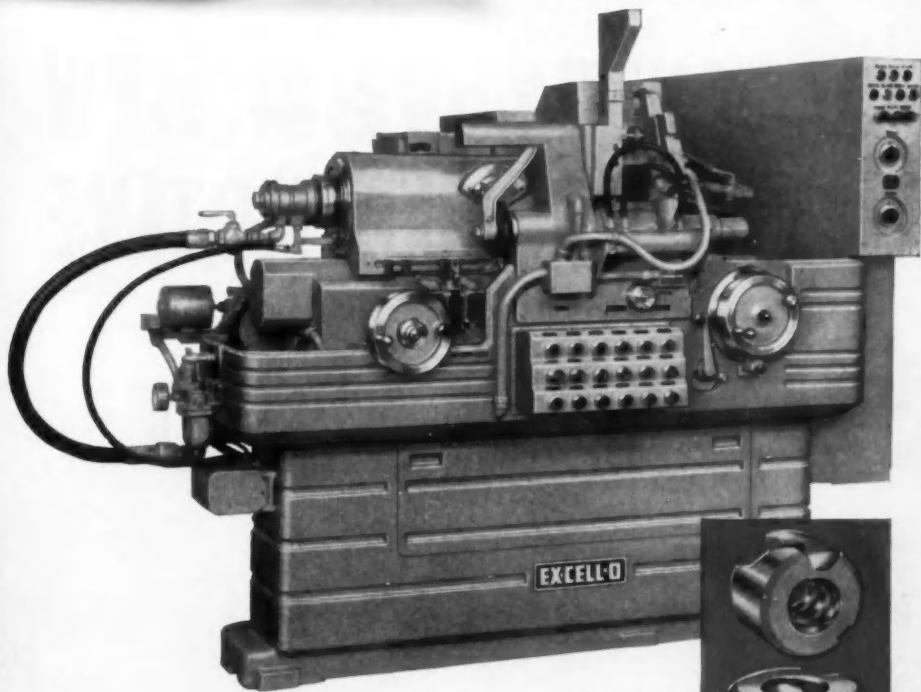
Part being machined is a Tractor Pedestal.

OPERATIONS: drilling, chamfering, reaming and spotfacing.

PRODUCTION — 33 pedestals per hour at 80% efficiency or a total of 858 operations per hour.



**BAUSH**  
MACHINE TOOL CO.  
SPRINGFIELD 7, MASSACHUSETTS



**Ex-Cell-O Style 39-A Precision Internal Thread Grinder** equipped with automatic work handling equipment. This machine loads, locates, grinds threads and ejects steering gear ball nuts in a completely automatic cycle.



**EX-CELL-O STYLE 33 FOR EXTERNAL THREADS:** An accurate production machine, automatic except for loading, unloading and moving the cycle lever. Can be arranged for tapered grinding and for eccentric relief grinding.



**EX-CELL-O STYLE 36 FOR LONG EXTERNAL THREADS,** also available with internal attachment. A high production machine with easily adjusted work cycles.



**EX-CELL-O STYLE 50:** A versatile machine for external work . . . also available with internal attachment.



**EX-CELL-O STYLE 120:** Our largest Thread Grinder. Grinds 10 feet of thread in one setting. Accommodates 12 feet of stock between centers.

# EX-CELL-O Thread Grinders

## Manual - Automatic - Automated

These standard machines are grinding thread gages, machine tool lead screws, innumerable aircraft parts, automotive steering mechanisms and pinions, worms, taps, and many similar workpieces.

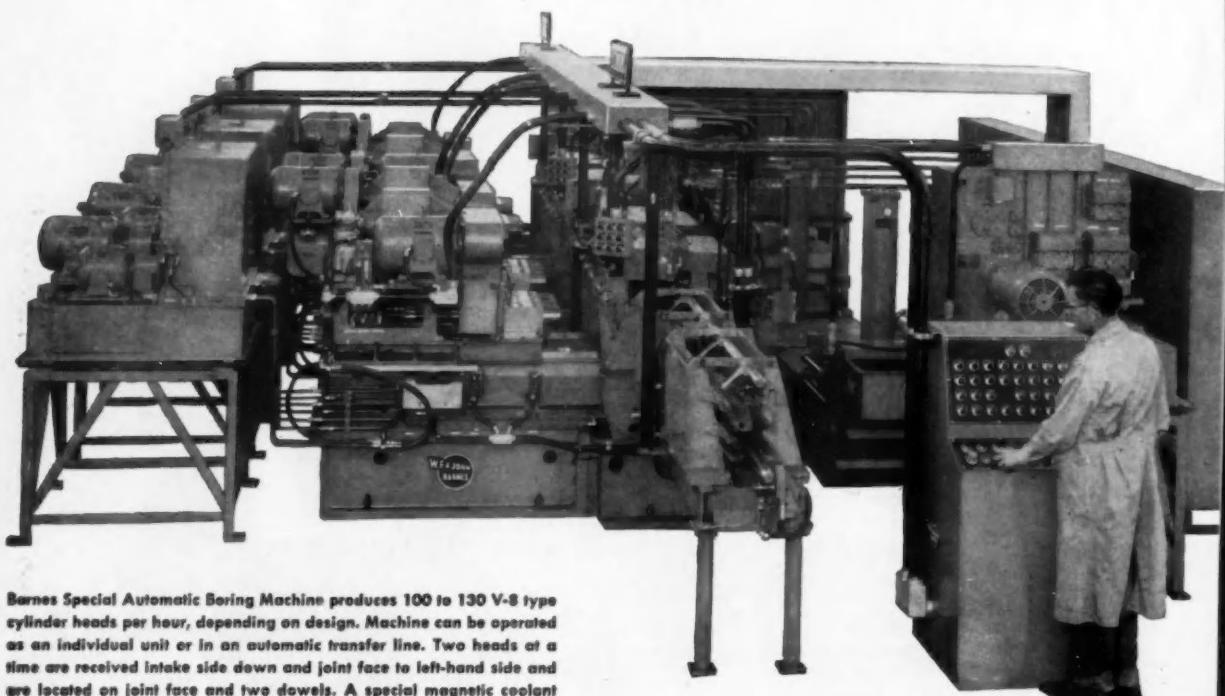
Precision thread grinders in this Ex-Cell-O line range from manually-operated models, for toolroom and for short runs, to high production automatics, to styles equipped with automatic work handling equipment. There are five models designed to meet your every requirement.

For specific information on thread grinder operations or a quotation on a machine for your requirements, call your local Ex-Cell-O representative or write Ex-Cell-O in Detroit.

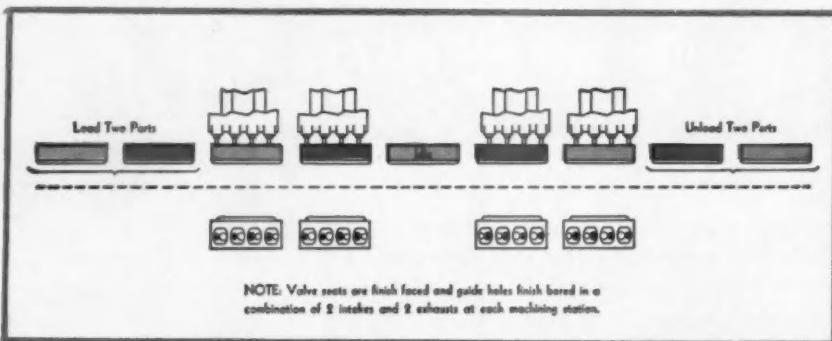
**EX-CELL-O CORPORATION**  
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND  
BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

# Now Available— NEW MACHINING AUTOMOTIVE

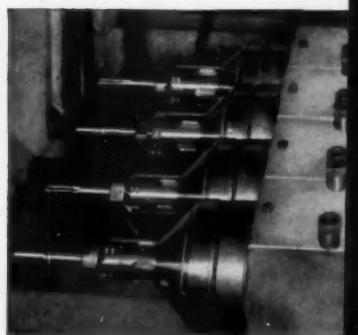


Barnes Special Automatic Boring Machine produces 100 to 130 V-8 type cylinder heads per hour, depending on design. Machine can be operated as an individual unit or in an automatic transfer line. Two heads at a time are received intake side down and joint face to left-hand side and are located on joint face and two dowels. A special magnetic coolant separator removes metal chips, insuring a fine machined surface.



NOTE: Valve seats are finish faced and guide holes finish bored in a combination of 2 intakes and 2 exhausts at each machining station.

Diagram above illustrates how heads are transferred two at a time and machining operations arranged to meet high output requirements. For lower production, machines are designed with fewer machining stations and one-station transfer unit.



Closeup of 4-spindle head with special tools for machining four valve seats and stem holes in one pass. Second 4-spindle head completes remaining operations.

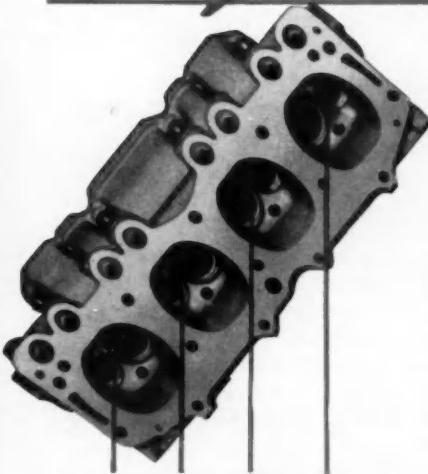


Builders of Better Machines Since 1872

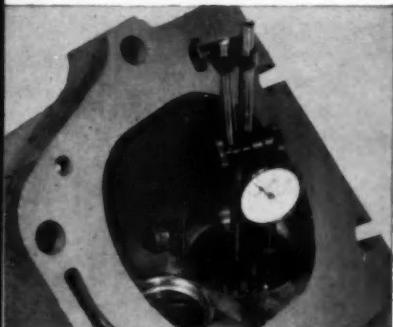
MULTIPLE SPINDLE DRILLING • BORING • TAPPING

# PRECISION METHOD OF FINISH VALVE SEATS AND STEM HOLES

## *Automatically*



Cylinder head for V-8 engine showing finish machined valve seats and guide holes. Red arrows indicate operations performed at first machining station.



Concentricity of valve seat and stem hole held to .0003" total indicator reading.

### EXCLUSIVE W. F. & JOHN BARNES MACHINING DEVELOPMENT HOLDS TOTAL CONCENTRICITY WITHIN .0005"

Now, a new precision machining method developed exclusively by W. F. & John Barnes makes it possible for you to finish machine automotive valve seats and stem holes on a continuous automatic basis. You can now eliminate corrective operations after normal boring, reaming, and seating operations, because this new development holds total concentricity within .0005" (total indicator reading). This new machining process, as incorporated into Barnes Automatic Progress-Thru Type Machines, consists of multi-blade tooling for the valve seating operations, combined with modified gun drilling tools for precision boring valve guide holes. Production tests show the valve seat tools produce 10,000 to 15,000 parts, and the boring tools, between 2,500 and 4,000, before regrounding or replacement is necessary. The net result has increased production efficiency and improved product quality at lower cost. Write for more facts today.

### TO SAVE TIME INVESTIGATE BARNES' 6-POINT MACHINE TOOL BUILDING SERVICE

For over 75 years, Barnes has designed and built special machinery. These years of experience can assist you in saving time and cutting costs. Check

the advantages of an engineering and building service from one convenient source.

- 1 **SPECIALIZED MANUFACTURING FACILITIES**—75-year background, large well equipped plant efficiently toolled to build high production machines.
- 2 **SPECIAL HYDRAULIC EQUIPMENT**—designed and built to meet JIC standards. Individually engineered units assure smooth, dependable actuation for every requirement.
- 3 **SPECIAL ELECTRICAL EQUIPMENT and CONTROLS**—individually designed and built for maximum safety and ease of control, with circuits that assure the most dependable coordination of all machine functions.
- 4 **SPECIAL GAUGES, FIXTURES, TOOLS**—designed for each individual machining problem, assure accuracy of operations at high production speeds.
- 5 **SPECIAL HANDLING AND CONVEYOR EQUIPMENT**—designed and built to reduce work handling, effect maximum safety and efficiency.
- 6 **COORDINATED DESIGN AND ENGINEERING**—Mechanical, Hydraulic, Electrical, Process, Tool, and Fixture Engineers work together at Barnes. Team-work solves complex problems quickly.

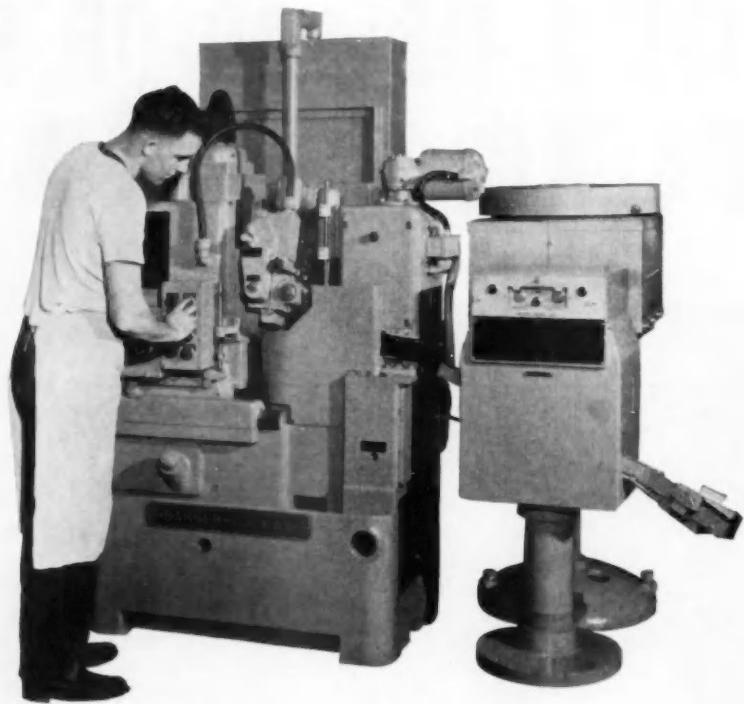
#### WRITE FOR FREE BOOKLET

Ask for free booklet "Coordinated Machine Engineering" describing the scope of Barnes machine tool building service.



**W. F. & JOHN BARNES COMPANY**  
**403 SOUTH WATER STREET, ROCKFORD, ILLINOIS**

**MACHINES • AUTOMATIC PROGRESS-THRU AND TRANSFER TYPE MACHINES**



## HIGH SPEED HOBBING *with automatic handling, loading, gaging*

BARBER-COLMAN  
**No.3-6**  
AUTOMATIC  
HOBBING MACHINE

The Barber-Colman No. 3-6 Vertical Hobbing Machine is a high speed machine designed specifically for automatic loading and automatic gaging of parts which are mass-produced. The machine has standard basic elements, but the tooling, loading, gaging and handling are designed for continuous operation and maximum production of a specific part. The high-speed operation of the machine makes it adaptable to all mass-produced parts up to 3" diameter by 6" face width, with maximum pitch capacity of 10DP. Hob speeds for carbide hobbing of non-ferrous and non-metallic blanks are available. Features which contribute to the high-speed operation of the machine include exceptionally large heat-treated and ground bed ways, short drives to the work and hob spindles, and a multiple-thread index worm.

### **here is a typical job**

**Gear:** 18DP, 16 T., 20° P.A., O.D. 1.077"/1.074"  
face width  $\frac{5}{8}$ ", SAE 1330 Steel

**Hob:** 2 $\frac{1}{4}$ " x 4" x  $\frac{3}{4}$ " bore, single thread, pre-shave, Class C Accurate Unground

**Machine:** Cycle Time — 1 minute  
Feed — .050"/rev.  
Speed — 250 SFM  
1 Per Load

If you have high production requirements for speedometer and transmission gears, starter pinions, appliance gears, or other mass-produced gear forms, send us blueprints or samples for estimates on automatic handling, loading, hobbing and gaging. Our engineers will show you how this new approach can be integrated into automatic, conveyor or transfer-type production lines to reduce time and cost per piece to a minimum.

### **High speed and reduced handling cut production time and cost**

#### ***Automatic Loading***

The machine shown here has a vibratory hopper. Blanks are automatically loaded from the hopper by a mechanically operated loading arm. All motions are held in time by keys and tapered pins so that servicing is easy. Gears are ejected and blanks loaded all with the same motion. The loader drive is separate from the machine drive, but electrically interlocked with machine operation. The type and variety of loading devices with which this machine can be equipped are almost unlimited. Loading can be by magazine or conveyor when required.

#### ***Automatic Gaging***

The gaging mechanism measures PD and rejects those gears oversize or undersize. If a predetermined percentage of gears are cut out of tolerance, the machine stops automatically. Gaging units for checking other gear elements can also be adapted to the machine and are readily available on the market.

#### ***Automatic Hob Shifter***

Automatic hob shifting is provided to shift the hob a certain amount after each cycle, or it can be arranged to shift after a certain number of parts have been cut. Shifting increments are changed easily by means of a graduated dial. The hob slide is clamped pneumatically.

#### ***Centerdistance Adjustment***

The hob is set to the proper depth by means of a centerdistance adjusting mechanism. The hob is placed in a fixture, and an indicator finger is set against the outside diameter. The indicator is calibrated to read directly the centerdistance between the work and the hob. This setting is made by means of a graduated dial on the machine and eliminates the usual time-consuming method of setting depth.

**BARBER-COLMAN COMPANY**

6610 ROCK STREET • ROCKFORD, ILLINOIS

*Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines*



**Gardner-Denver...Serving the World's Basic Industries**

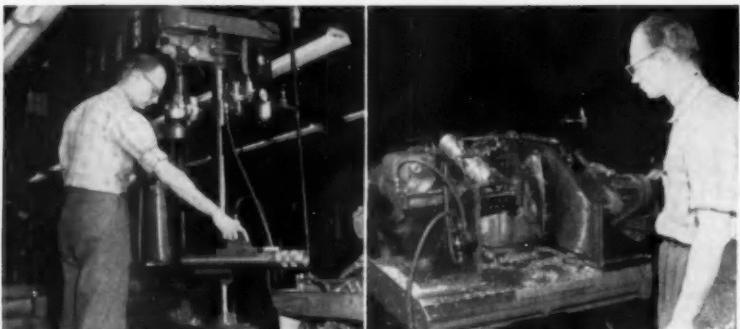


At this drill press station, four Keller Tool "Airfeeddrills," with five-, six- and eight-inch strokes, drill four extra holes in the workpiece as the drill press finishes one hole from above.

### **Drills 4 extra holes . . . production time: zero!**

Production men have found a new and ingenious way to complete drilling operations with no extra production time. When a workpiece has to be jigged or put in a drill press for some operation, they mount Keller Tool "Airfeeddrills"® in position to perform additional drilling, reaming, tapping or facing operations at the same time. The illustrations on this page show how it's done.

Ideal for mounting in multiple units or as single outriggers, Keller Tool "Airfeeddrills" and "Airfeedtappers"® perform complete work cycles automatically—at the press of a button. Further details are available in Bulletin 92.



Operator presses a button—and the Keller Tool "Airfeedtapper" provides a free tapped hole while standard machine taps three holes at top of piece.

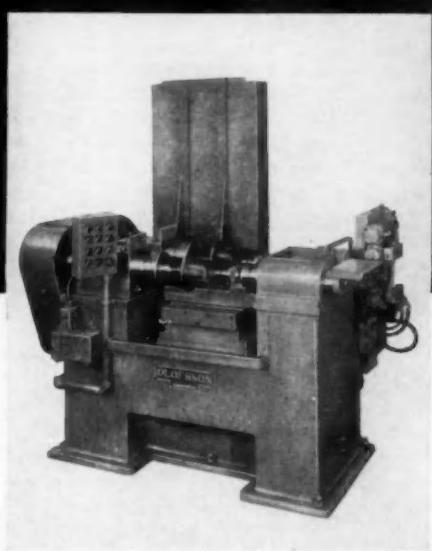
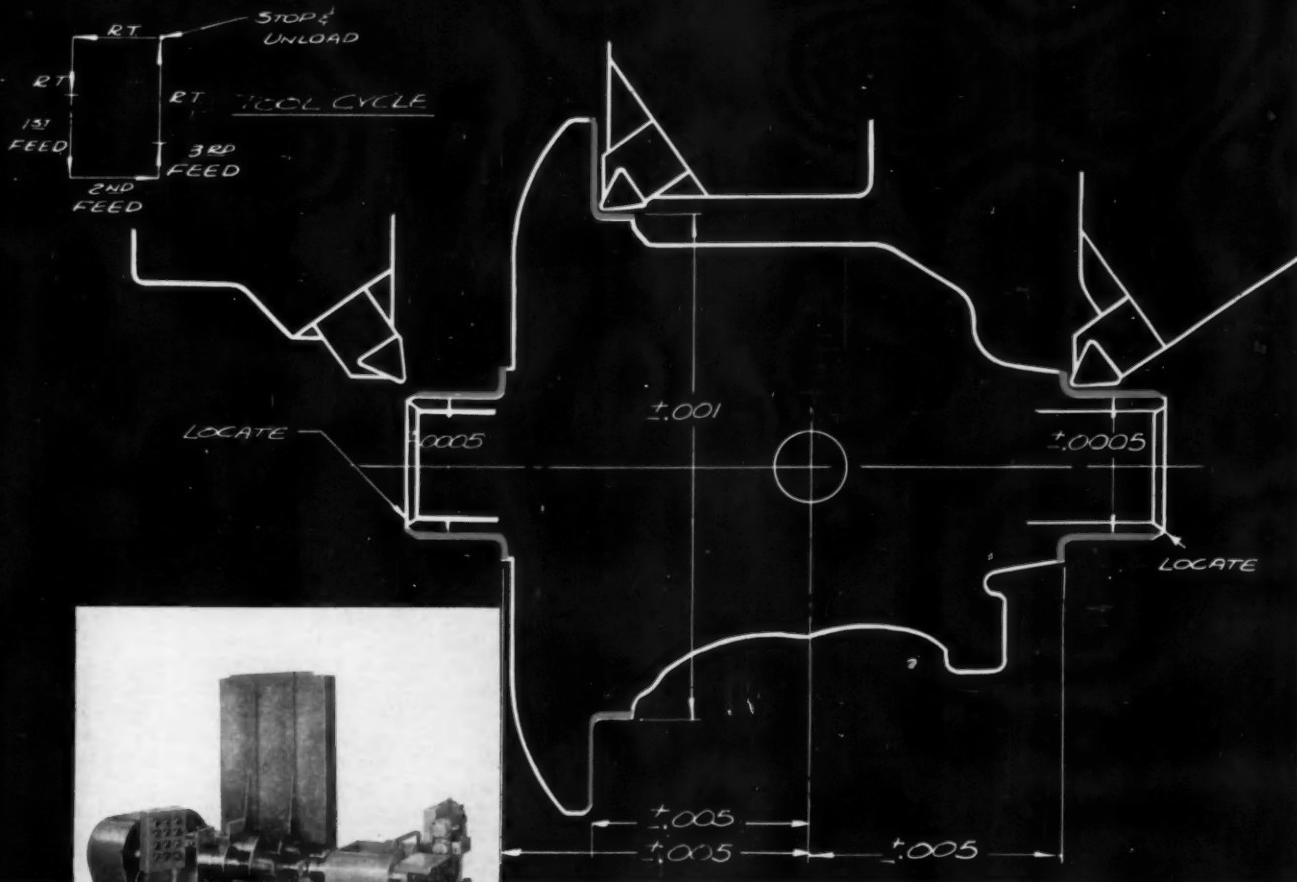
While special multiple head unit drills eight holes in the work, an "Airfeeddrill" mounted at rear of fixture step drills a "free"  $\frac{1}{4}$ - $\frac{3}{16}$ -inch hole at an odd angle.

## **GARDNER - DENVER**

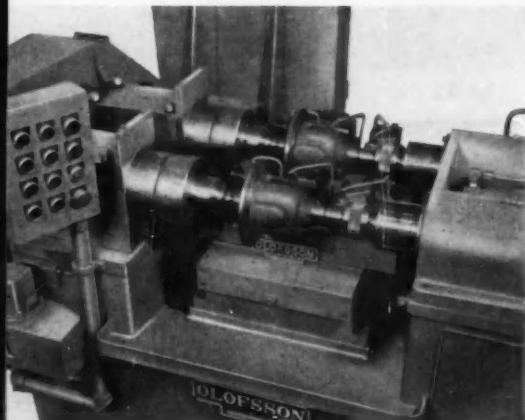
**KELLER TOOL division, Grand Haven, Michigan**

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS  
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY





Olofsson Special two-Station Precision Lathe.



Close-up view of differential cases clamped into position.

## IT FIGURES!

**For Your TOUGH Production Problems,  
Olofsson SPECIAL Machinery . . .**

For example, this 2 Station Precision Lathe can finish face and turn two hubs, and finish face and turn the flange on an automobile differential case, cast of cylinder iron, at the rate of 60 per hour. This production is possible because the design reduces operator fatigue and human error, provides push button operation.

Here's How It Works . . . The operator inserts a dog driver bar into the part, loads both stations of the machine and pushes the combination clamp, start-cycle button. That's all there is to it until the parts are ready for unloading.

For low tool replacement costs and quick change, the new type throw-away carbide cutting tool inserts are used. The lathe conforms to J.I.C. electrical and hydraulic standards.

If the cost of any phase of your machining operation is running too high . . . or if output is lagging . . . consult with Olofsson. You'll find it pays to "Special-ize" with Olofsson Special Machinery.



Today, put the Olofsson Engineering department to work for you. A letter or phone call will do it.

2730 Lyons Avenue, Lansing, Michigan

# News of the MACHINERY INDUSTRIES

By Thomas Mac New

Lead of Automobile Manufacturers in Capital Investment per Worker Over Average of Other Industries Continues to Increase

The value of new equipment to industry has been summed up very nicely in one sentence by the Council For Technological Advancement in its new booklet *Trends in Equipping the American Worker*. That sentence reads, "Improvement in equipment doubles productivity of the average American worker each generation."

Even though the story has been repeated so many times about new equipment increasing output and reducing prices, many industrial establishments are still making use of obsolete equipment in a highly competitive market. There is a complete line of variances as to why new equipment is not purchased. Today, however, there is no real excuse as there are so many plans by which machines can be purchased or leased to meet the needs of the plant. It is true that a change is of no value just for the sake of change, but machinery and equipment producers have been giving more and more value in their line of products.

Machinery prices are down in respect to productivity and the high quality of the manufactured product. While wages have gone up some 31 per cent since 1951, machinery prices have only increased by 18 per cent. The machines, however, have increased output, but man can still only do the work of man. It is machinery which makes man a productive giant. Since industry must be faced with higher wages and raw material cost, it has to have efficient machines to keep overall costs down so as to have a salable product.

In the automobile industry, the companies have invested an average of over \$15,000 per production employee in plant and equipment in order to turn out a product in reach dollar-wise of the buying public. This industry alone buys millions and millions of dollars worth of equipment each year to keep its manufacturing facilities modernized to maintain its

expanding market.

Just in the manufacturing phase of our economy, the capital invested per production employee has gone up from \$6205 in 1939 to \$11,980 in 1952 or roughly double. If the dollar value is put on the same basis for each year, we find that there has been no real improvement over the years. In the car plants, however, there has been about a 25 per cent increase in capital invested per worker. With that increase, plus what has been done over the years from 1952 to present, these large manufacturers have a far-reaching effect on our economy.

The rest of the transportation industry has been headed downhill at a rapid pace. Based on the same dollar value, these plants had an average of only about 50 per cent as much invested in each worker in 1952 as they had in 1939. There has been some improvement recently but not much.

In all industry, the CTA tells us, a minimum of \$40 billion should be saved and invested in private productive facilities each year. This capital should be used to maintain existing equipment, provide facilities for new workers, and provide for a 1½ per cent per year increase in output per worker. This is just to maintain the

same relative market position for each firm.

The Council claims that the \$25 billion of the total are needed just to maintain existing plant and equipment. For all industry this amounts to \$450 a year just to maintain one job. The average investment per production worker for all industry is \$12,500 versus the \$15,000 figure for the automobile group so the car makers require roughly a quarter more or \$560 to maintain each job.

## Machine Tool Business Up 24 Per Cent in First Half

Although new orders for machine tools in June were off nearly \$25 million from the preceding month, total business for the first six months rose to \$509.15 million, 24 per cent ahead of the same period last year. Shipments in June, on the other hand, remained practically unchanged from May, totalling \$75.9 million. The next six months should show a further improvement in sales in view of new orders expected from farm implement machinery builders, road construction machinery makers, and acceleration of the Government's tool-ordering program.

TABLE I

### Metal Products and Processes Capital Invested Per Production Employee (Dollars)

Industry	1952	1939
Automobiles	15,064	6,490
Primary metal	14,122	....
Machinery, except electrical	11,333	7,396
Electrical machinery	10,285	4,627
Transportation equipment, other	8,338	8,331
Fabricated metal products	7,718	....

Source: National Industrial Conference Board

# *Forming Equipment Section*

BENDING

PRESSING

ROLLING

AUTOMOTIVE INDUSTRIES

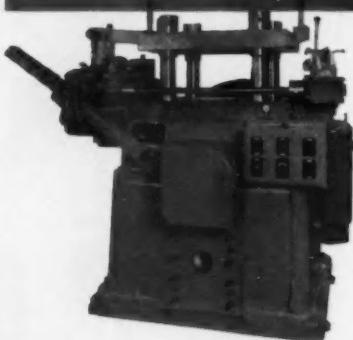
1956 MACHINE TOOL &  
PRODUCTION EQUIPMENT ISSUE

AI

here's production you can plan on with

# BRANDES

## AUTOMATIC PRESSES

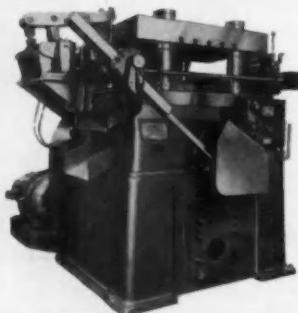


### BRANDES 90 TON PRESS

All Brandes Presses are built for ease of operation, with friction clutch and automatic lubrication standard equipment. The vertical bolt lines hold the vertical "V" ways which guide the lower slide. The scrap cutters have heavy square gibbing with exceptionally long ways. The position of the scrap cutter and blades is adjustable.

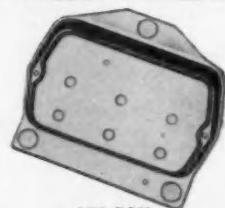


90 TON  
PRESS PRODUCTION  
—Cover 1½" deep—.035"  
C.R.S. at 75 strokes per  
minute.

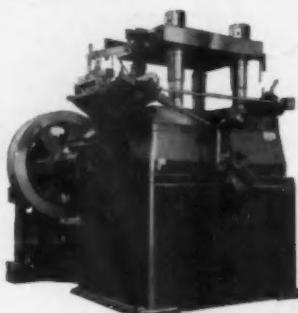


### BRANDES 175 TON WIDE BED PRESS

Like all Brandes Presses, the 175 ton features larger die areas—longer die life—patented multiple "V" guides assuring perfect die alignment—low center of gravity—elimination of special pits. Die clearance on the 175 is 28" F to B and 60" R to L.



175 TON  
PRESS PRODUCTION  
—Cover .050" C.R.S.—¾"  
deep at 75 strokes per  
minute.



### BRANDES 550 TON PRESS

Note the sturdy construction of this press which incorporates all the exclusive performance features of the smaller units described above. The quick feed eccentric is standard on this size machine as is the design arrangement of single back-gear. This press accommodates a die up to 10 ft. in length. Special width and length built on request.



550 TON  
PRESS PRODUCTION  
—Base 7½" deep — .149"  
H.R.S.—draw and coin —  
30 strokes per minute.

WRITE FOR COMPLETE FOLDER

**THE BRANDES PRESS CO.**  
6408 Euclid Avenue • Cleveland 3, Ohio

BUILDERS OF FINE PRESSES FROM 30 TO 4,000 TON

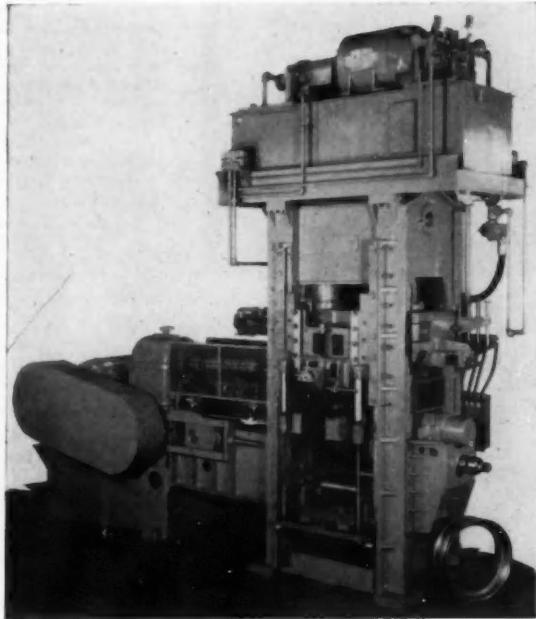
**AI**

# Forming Equipment

## SECTION

FOR ADDITIONAL INFORMATION  
please use reply card on PAGE 163

**McKAY MACHINE CO.**



**ROLLER**—Wheel rims are automatically turned out on this roller, which rims, feeds, and transfers the rims into and out of the machine in a straight line by electrically controlled, pneumatically operated conveyors. The rim is mounted for rolling automatically on the work rolls. During transfer, the bottom roll retracts automatically and completely on its axis out of the rim's path. The rim transfer devices are integral with the machine. Vertical motion of the conveyor is obtained by direct connection with the top ram. The pneumatically operated side and center guides are also mounted on the upper ram.

Circle 85 on postcard for more data

### SECURITY CONTROLS, INC.

**SAFETY CONTROL**—SCI-200-1, an electrical safety control for mechanically tripped (clutch operated) machines and presses, functions on "stored energy." When hand buttons are depressed, the line voltage is disconnected and the "stored energy" is released to operate an air motor or electric solenoid. Both hand buttons must be released to permit recharging the capacitor to produce "stored energy" for the next machine cycle.

The device also incorporates a time delay adjustment that permits changing the time interval between the depression of the first and second hand buttons. In addition to non-repeat operation, the system can be changed by a selector switch to repeat operation for either hand or foot switch control. By this method the press continues to cycle as long as the hand

button or foot switch is held down. If the button or foot switch is released, the press will stop and the entire cycle must be repeated.

Circle 86 on postcard for more data

### W. WHITNEY STUECK, INC.

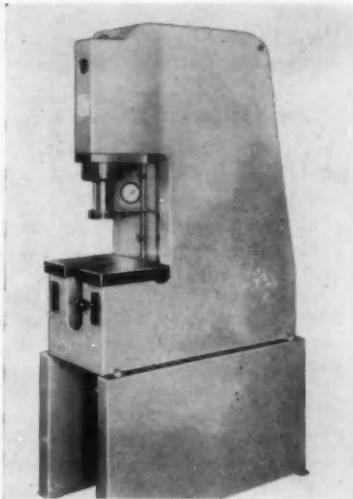
**PRESS BRAKE**—Model 24-A-412, with 24 tons rated capacity, features all-steel gearing, front-operated variable speed drive, one-hp motor, and front-operated back gage. It will bend four ft of 12-gage mild steel over a  $\frac{1}{8}$ -in. die.

The bed and ram are 48-in. long and the distance between side frames is 32-in. Stroke is 2-in. and adjustment of ram by means of enclosed worm-gearred pitmans is  $1\frac{1}{2}$ -in. Die space over bed is  $7\frac{1}{2}$ -in. with stroke down, adjustment up, and gap is 6-in. deep.

Circle 87 on postcard for more data

### NORTHERN TOOL AND MACHINE CO.

**HYDRAULIC PRESS**—High speed hydraulic presses for fast production operate at up to 520 ipm closing and return speeds. Controls are sensitive to the touch, yet the ram can be slowed down or stopped at any point. At the bottom of the work stroke the hand or foot may be removed from the con-



trol, and the ram will return to a predetermined setting. Presses are made in 10 and 20 ton capacities. They are available with hand, safety dual-hand, or foot control. Ten-ton size can be furnished electrically controlled.

Circle 88 on postcard for more data

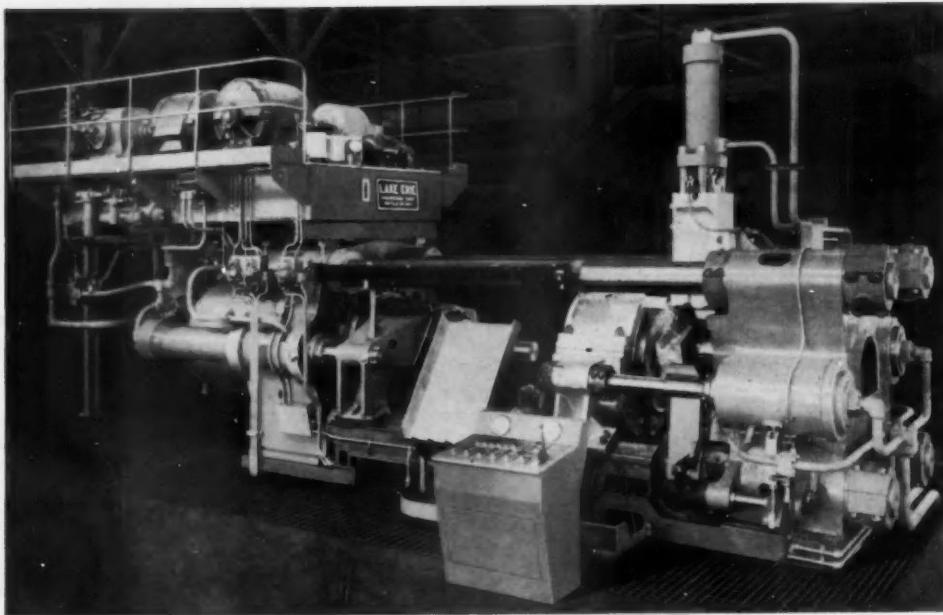
### MICHIGAN TOOL CO.

**SPLINE ROLLER**—Model 1551 is capable of cold forming splines and other shapes up to two inches in diameter. The unit forms tooth and grooved shapes on shafts by rolling the piece between two parallel-acting racks. The overarm or tail stock is universally adjustable for parts ranging in length from 12 to 36 in.

Circle 89 on postcard for more data

## Forming Equipment SECTION

LAKE ERIE ENGINEERING CORP.



**EXTRUSION PRESS** — The first of a series of 2300-ton aluminum extrusion presses, this machine is capable of extruding billets from six to nine-in. diam and up to 30-in. length, as well as rectangular billets, of speeds up to 48 ipm. Fast approach speeds of 825 and 760 ipm respectively permit a non-extrusion time of less than 20 sec. Controls are interlocked and semi-automatic operation is provided for either flat or bridge type dies.

Circle 90 on postcard for more data

### COOPER-WEYMOUTH, INC.

**SLIDE FEED**—Model M-256 is a smaller air operated slide feed, with open throat, for automatic feeding on light punch presses. The unit operates on shop air lines at 50 to 100 psi, and takes materials up to a maximum thickness of 1/16-in. and to maximum widths of 6-in. in lighter gages. It has a maximum feed length of three inches, operating at 200 strokes per minute, and will feed at correspondingly higher speeds when shorter feed lengths are used. Simple to set up, only one screw adjustment is necessary. While it operates off the press crankshaft, the length of the press stroke does not affect the feed length.

Circle 91 on postcard for more data

### PAUL MACHINE TOOL & DIE WORKS

**HYDRAULIC PRESSES**—Self-contained presses for trimming, molding, forming and similar operations are available in sizes from 25 to 100 tons. The four-column presses feature steel construction and provide adjustable shut height, and adjustable daylight with an inching control in the top platen. The ground columns fit line bored holes in the platens. A T-slotted precision ground bolster plate is standard.

Power is supplied from a differential circuit type hydraulic unit with

high and low pressure pumps driven by a double shaft motor. Electrical controls are well interlocked for safety. Any part of the cylinder stroke may be used.

Circle 92 on postcard for more data

### DENISON ENGINEERING CO.

**MULTIPRESS**—One-ton press is designed for such operations as assembling, riveting, punching, marking, timing, pelleting, compacting, testing, straightening, broaching, swaging, etc., and to fit into automated lines working in conjunction with various types of feed mechanisms. The ram pressure of the unit can be set from 500 to 2000 lb. A dual electric control system insures safety as the unit will operate only when both hands are on the actuating buttons.

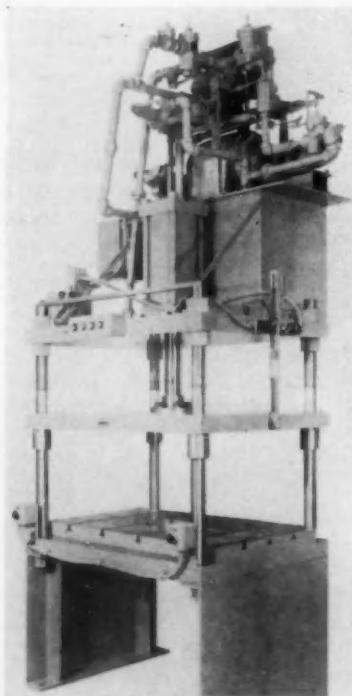
Circle 93 on postcard for more data

### AMERICAN BROACH AND MACHINE CO.

**PRESS**—A 25-ton press with electrical controls automatically assembles and stakes the drive flange of an automotive transmission to a pinion gear and then assembles a bushing into the gear. The machine is equipped with a special work base, a hydraulic assembly cylinder, hydraulic loader and hopper feed. A spiral bar and nut assembly guides the flange in assembly to the helical spline teeth of the gear.

Tooling includes a helical spline locator, for location of gear in work nest from previously cut teeth, and hardened and ground staking tools mounted on the ram nose piece.

Circle 94 on postcard for more data



### NIAGARA MACHINE & TOOL WORKS

PRESS—Redesigned upright (series B) and open back inclinable (series BI) presses are suitable for a variety of work involving long, progressive dies; multi-station dies, automatic feeds and drawing operations.

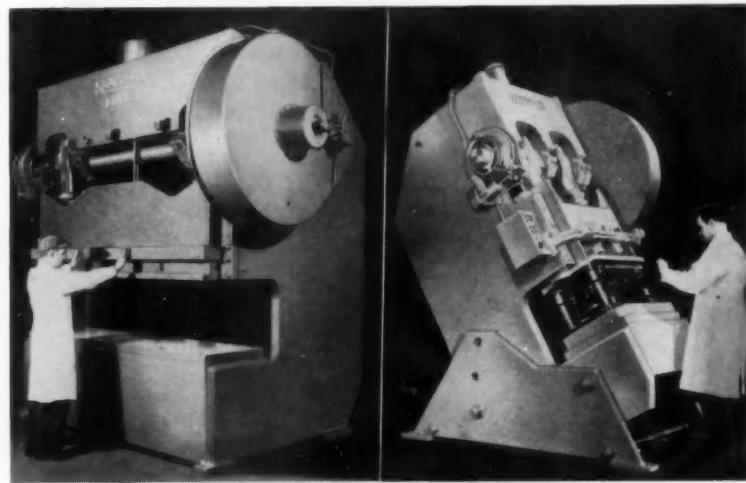
Standard capacities, at 1/16-in. above bottom of stroke, are: series B, 45-200 tons; series BI, 60-200 tons.

A wide, all-welded steel, box type slide, fully contained within the gibbing, rigidly supports the punches without overhanging flanges. Precision V flat gibbing is brought down closer to the point of application than is possible on flanged slide single crank presses. The rigid, integrally built, all-welded steel, stress-relieved frame resists deflection. An adjustable air counterbalance provides smooth press action.

Circle 95 on postcard for more data

PRESS—Single crank straight side presses, in a new line, feature enclosed construction, front and back, concealing the driving mechanism. There is no overhanging flywheel, clutch, brake, intermediate shaft or motor in the rear of the press.

Greater accuracy and longer die life are said to be obtained by the all-steel one-piece frames of box section



ing and forming dies. The units are equipped with electro-pneumatic clutch controls.

They are available in capacities of 100 to 400 tons and can be furnished optionally with automatic lubrication, pneumatic die cushions, automatic feeds, variable speed drives, knockout bars and other features to meet individual needs.

Circle 96 on postcard for more data

### JOHNSON MACHINE & PRESS CORP.

DOUBLE-CRANK PRESS—Two double-crank press lines feature box-type rams, large bed areas, low inertia clutches and electrical controls.

The new straight side series is available in 30, 40, 60, 80, 100 and 150 ton capacities. These are high speed blanking flywheel type presses with variable speed drives up to 300 strokes per minute, or back geared presses for drawing, forming, punching or piercing jobs. The 80-ton model with a 52 by 30 in. bed has a 48 by 30 by 3½ in. bolster plate, 48 by 24 in. ram face and a bed opening 36 by 6 in. The crankshaft has a two-in. stroke and the shut height over bolster is 18 in. It has a three-in. slide adjustment and performs at the rate of 60 strokes per minute.

The G-2 Series is a line of Double Crank capacity presses. These are offered in 60, 80, 100, and 125 ton capacities. The 60-ton model of this series, with a 56 by 22-in. bed size, has a bed opening 28 by 10 in. and a ram face 40 in. by 22 in. The speed of the backshaft is 303 rpm. The geared model makes 50 strokes per



design, which provide resistance to deflection from horizontal, diagonal and torsional stresses. Box type welded steel slides are power adjusted through self-locking barrel type connections to accommodate a range of die heights and facilitate die setting. The shut height and slide adjustment permit the use of a variety of stamp-

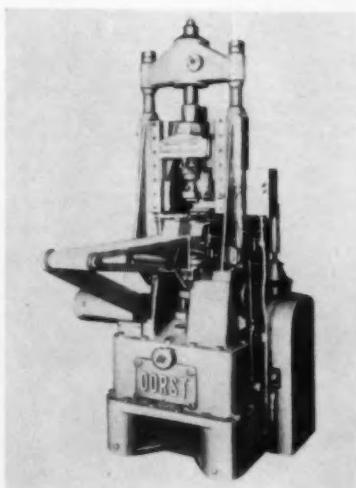
minute, whereas the flywheel press operates at 100 strokes per minute. The depth of the throat is 12 in.

Circle 97 on postcard for more data

### ARNHOLD CERAMICS, INC.

POWDER METAL PRESS—The Dorst automatic powdered metal press is now available in a new 110-ton model. It is capable of producing 4 to 20 pieces per minute, depending upon the intricacy of the part.

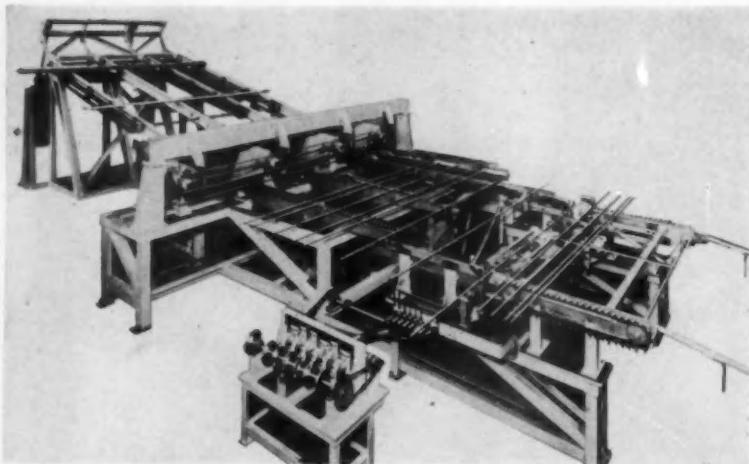
Features include: Adjustment controls with micrometers for the pre-



press movements; automatic fill, press and ejection of the material; variable speed drive; capacity up to 20 strokes per minute; and pick-up mechanism and conveyor belt to remove pressed parts automatically.

Circle 98 on postcard for more data

## Forming Equipment SECTION



### EXPERT AUTOMATION MACHINE CO.

**BENDING MACHINE**—An automatic bending machine can make two bends at each end of a steel rod at rates up to 960 rods per hour. The machine has a mechanically operated rotary index drum that indexes rods from a feed chute to two bending stations. Inner and outer bends are produced in each rod end by bending dies powered by single-rotation hydraulic rotary actuators. Finish-bent rods are carried out of the machine by a roller chain conveyor.

The rotary actuators are adjustably mounted, enabling a wide variety of bend angles to be produced in each bend, as well as assorted plane relationships between the two bends in each rod end. Width of the index drum and machine size depend on the diameter and length of rod stock to be bent.

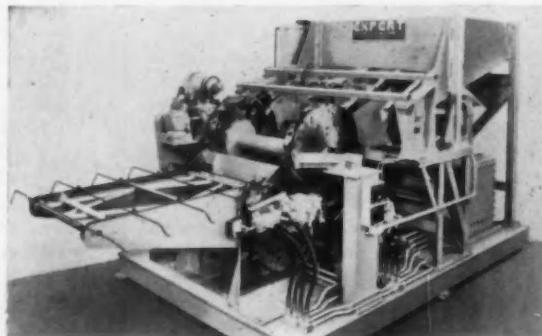
Rods to be bent are placed in a feed chute where they slide by gravity to a position ahead of the drum index. They are picked up one-at-a-time and clamped by spring-loaded toggle

clamps on the periphery of the drum. These toggle clamps, which are opened by cams at the drum loading station, grip the rods firmly near each end throughout the index and bending operations.

A motor-driven cam index mechanism transfers the rod to the first bending station where the outer bends are produced on each end by the rotary actuator-powered dies. Then the rods are indexed to the second bending station where the inner bends are similarly produced on each end completing the bending operations. The bent rod is then indexed to the third station where it is stripped from the drum and deposited on a roller chain conveyor.

Each of the four rotary actuators that power the bending dies are slide-mounted and are moved in and out of bending position by a hydraulic cylinder. The actuator and slide assemblies are cradle-mounted to provide adjustable bend angles and plane relationships.

*Circle 99 on postcard for more data*



*The Expert machine illustrated bends  $\frac{3}{8}$ -in.-dia., 5-ft long heat-treated spring steel rods to form automotive trunk lid torsion bars at a rate of 960 rods per hour. Two bends of approximately 90 deg are formed on each end of the rod. One bend has a leg  $\frac{3}{4}$ -in. long.*

### EXPERT AUTOMATION MACHINE CO.

**ROLL FORGING PRESS**—Standard heating furnace and roll forging press equipment is used with automatic handling devices to preheat and point the ends of 12-ft long,  $\frac{3}{4}$ -in. diameter coil spring rod blanks. The machine receives bundles of coil spring rod stock on a conveyor, feeds the rods at a controlled rate through a furnace to heat the ends to 1900F and conveys them one at a time to a reciprocator mechanism. This reciprocator feeds the rods into the cam-operated roll forging machine three times, thus forging the rod end to a taper-pointed shape concentric with the rod and putting the part number on the rod.

From the forging press, the rods are delivered to a chain conveyor where they are cooled at a controlled rate and directed to another cradle which conveys loads of rods to the spring coiler.

All operations of the rod pointing automation unit are either operated or controlled by the forging press. The single operator controls only the incoming and outgoing coil cradle conveyors. Where craneways are available, incoming and outgoing conveyors are not required in the automation setup.

*Circle 100 on postcard for more data*

### CLEVELAND PUNCH & SHEAR WORKS CO.

**DOUBLE-CRANK PRESS**—Open-back gap press is mounted on separate legs so that the body of the press can, if desired, be set in an inclined position to make use of the open back feature for gravity discharge of finished pieces. This is a modification of the upright position in which it is usually furnished.

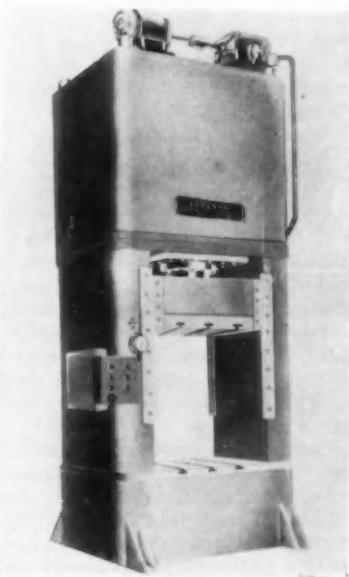
The machine, which is single geared, single end drive, is equipped with a single station electrically controlled air operated drum type friction clutch with spring loaded brake. The flywheel is fitted with an auxiliary air brake to bring it to a stop when the power is shut off, and the slide is counterbalanced by air. A centralized manually operated lubrication system is provided within easy reach.

The press has a capacity of 250 tons, a stroke of 16-in., adjustment to the slide 10-in., distance bed to slide (stroke down, adjustment up) 37-in., and a bed of area of 42 x 72-in. It is also equipped with a pneumatic cushion in the bed which has a capacity of 42 tons at 100 lb air pressure.

*Circle 101 on postcard for more data*

### CLIFTON HYDRAULIC PRESS CO.

**HYDRAULIC PRESS**—Model SF 300 double-action hydraulic press is electrically controlled for either automatic or semi-automatic operation. The slide return may be controlled by either pressure or length of stroke



setting. The slide return may be inched up or down, or the press operated manually when the slide is in the up position. The pump bypasses at zero pressure. This side frame press may be equipped with hydraulic cushions in the bed for metal drawing applications. It can be built to meet practically any speed, stroke or platen size requirement, and is available in capacities of 50, 100, 150, 200 or 300 tons.

Circle 102 on postcard for more data

### ELMES ENGINEERING DIV., AMERICAN STEEL FOUNDRIES

**PRESSES**—Small-press users with power pressure requirements in excess of capacities formerly available in Hydrolair presses, can now obtain these production presses in 75 and 100 ton sizes as well as the previously available 30 and 50 ton sizes. All sizes are available with either hand lever or optional electric pushbutton control. The press operates from a special hydraulic intensifier, so-called Power-Petuator—being powered solely by compressed air. This device provides a continuous high-pressure stroke and maintains any preset pressure for as long as desired, without any attention from the operator. Among uses of

these presses are plastics molding, rubber molding, compacting, laminating, assembly, forming, gluing and laboratory test work.

Circle 103 on postcard for more data

### HAMILTON PRESS DIV., BALDWIN-LIMA-HAMILTON CORP.

**MECHANICAL PRESS**—Double-crank, straight-side presses of welded steel construction from 100 to 300 tons capacity feature gears running in oil, mechanically interlocked pneumatic clutch and brake unit, barrel type motorized slide adjustment, automatic lubrication, pneumatic flywheel brake, die lights, die cushions, pneumatic counterbalances, and an interlocked electrical clutch control.

This line of machines can also be altered from these specifications to suit individual requirements. Electrical controls are also available to meet particular electrical standards.

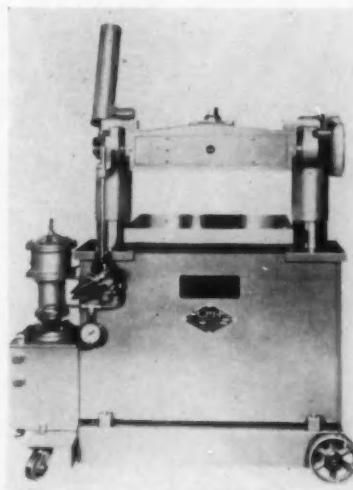
Circle 104 on postcard for more data

### ALPHA PRESS AND MACHINE, INC.

**PRESSES**—Die tryout presses of 50 or 75 ton capacity are operated either pneumatically or hydraulically. The head can be released and rotated to any point up to 240 deg. The base houses two hydraulic cylinders. The

50-ton press occupies 28 by 56 in. of floor space. Overall height with stroke down is 64 in. The 75-ton press occupies 30 by 60 in. of floor space; overall height with stroke down, 66 in.

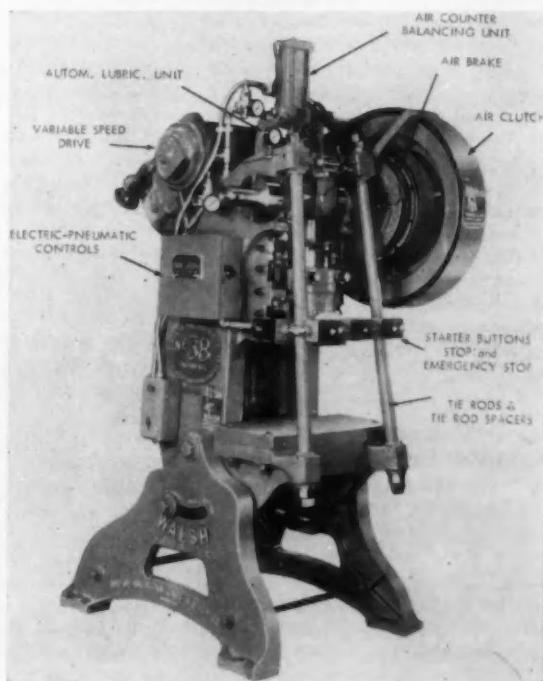
Tonnage of the press is based upon 80 psi air pressure. Both models are



mobile. Both die members can be barbed, sheared, fitted and finished without removal from press.

Circle 105 on postcard for more data

### WALSH PRESS AND DIE CO.



## Forming Equipment SECTION



*Bliss gap frame die tryout press with hydraulic action*

### E. W. BLISS CO.

**HYDRAULIC PRESS** — Developed for die tryout and pilot production runs, a new hydraulic press combines the best features of hydraulic action and gap frame construction. Precise control over inching permits close observation of die action. Full tonnage is available at any point in the stroke. The stroke itself is longer than that for standard inclinable presses and compensates for die space and press set-up adjustments, which facilitates die tryouts and pilot runs.

Frames conform to standard inclinable press specifications, including arrangements for inclining. All models are built to receive standard press accessories and Bliss-Marquette die cushions, and are available in capacities ranging from 50 to 250 tons.

*Circle 107 on postcard for more data*

### HAMILTON PRESS DIV., BALDWIN-LIMA-HAMILTON CORP.

**MECHANICAL PRESS** — Welded-steel, top-drive, full-eccentric type presses from 400 to 4000 tons capacity. These machines feature a so-called double lube system of lubrication, incorporating pressure lubrication and also an auxiliary system of troughs and gravity flow to keep all

bearings lubricated even if the pressure and flow switches should fail.

The air clutch embodies the unusual feature of being both a low inertia type and yet mechanically interlocked. It does not depend on the timing of valves and switches to prevent overlap. The low inertia design allows for clutching and de-clutching at speeds almost equal to the continuous speed of the press. This clutch also can be inched at low torque when setting dies. If the slide should become stuck on bottom center when setting dies, it is stuck with low torque and may easily be unstuck.

*Circle 108 on postcard for more data*

### WALES-STIPPIT CORP.

**TUBE PIERCER** — Double acting tube piercing units for use in press brakes and punch presses are designed to produce clean, accurately located single or multiple holes in tubular parts. Alignment between upper and lower sections is obtained simply by applying a straight edge to the surfaces of the adapter plates which fit over the tubing in the punch. Since there is no die in the unit, there is no danger of shearing the punches through misalignment. The units can be set up on flat plates for mounting

to bolster and ram plates of punch presses. Keyed plates for mounting individually in press brakes can also be furnished. For a series of holes, templates for mounting the desired number of units in the required positions can be supplied.

Capacities of standard units are  $\frac{1}{2}$  to one in. O.D. tube; maximum punch diameter 0.312 in., maximum wall thickness of tubing 0.093 in. Special units for larger holes and larger tubing are available.

*Circle 109 on postcard for more data*

### THE CARLSON CO.

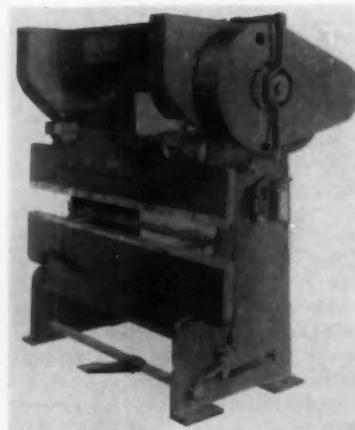
**AIR PRESS** — Bench-mounted, high-speed air press, designed for spring manufacturing including looping, bending, forming, coiling and pressing, can also be used for light punching, trimming, cutting, crimping and other secondary operations. Over 1800 loops and 3000 punches per hour have been made.

The press comes with bolster plate, foot switch, solenoid valves, electrical fittings and air line connections. An adjustable screw stop controls the stroke of the ram up to 2 in. and ram speed is controlled by a valve on the air line. Size of frame is 8 in. wide, 11 in. deep and 22 in. high overall.

*Circle 110 on postcard for more data*

### DREIS & KRUMP MFG. CO.

**PRESS** — All-steel Chicago series A press brake, 30 ton capacity, features welded construction. Twin Disc fric-



tion clutch and band brake are mounted on flywheel shaft. Hand operated back gage is standard; full range of optional features are available.

*Circle 111 on postcard for more data*

# A Variety of Work plus Transflex Feeding?



## Ask JARECKI about the new **CLEARING TRANSFLEX**



Closeup of Transflex feed which is now adjusted to automatically feed an automotive valve cover stamping.

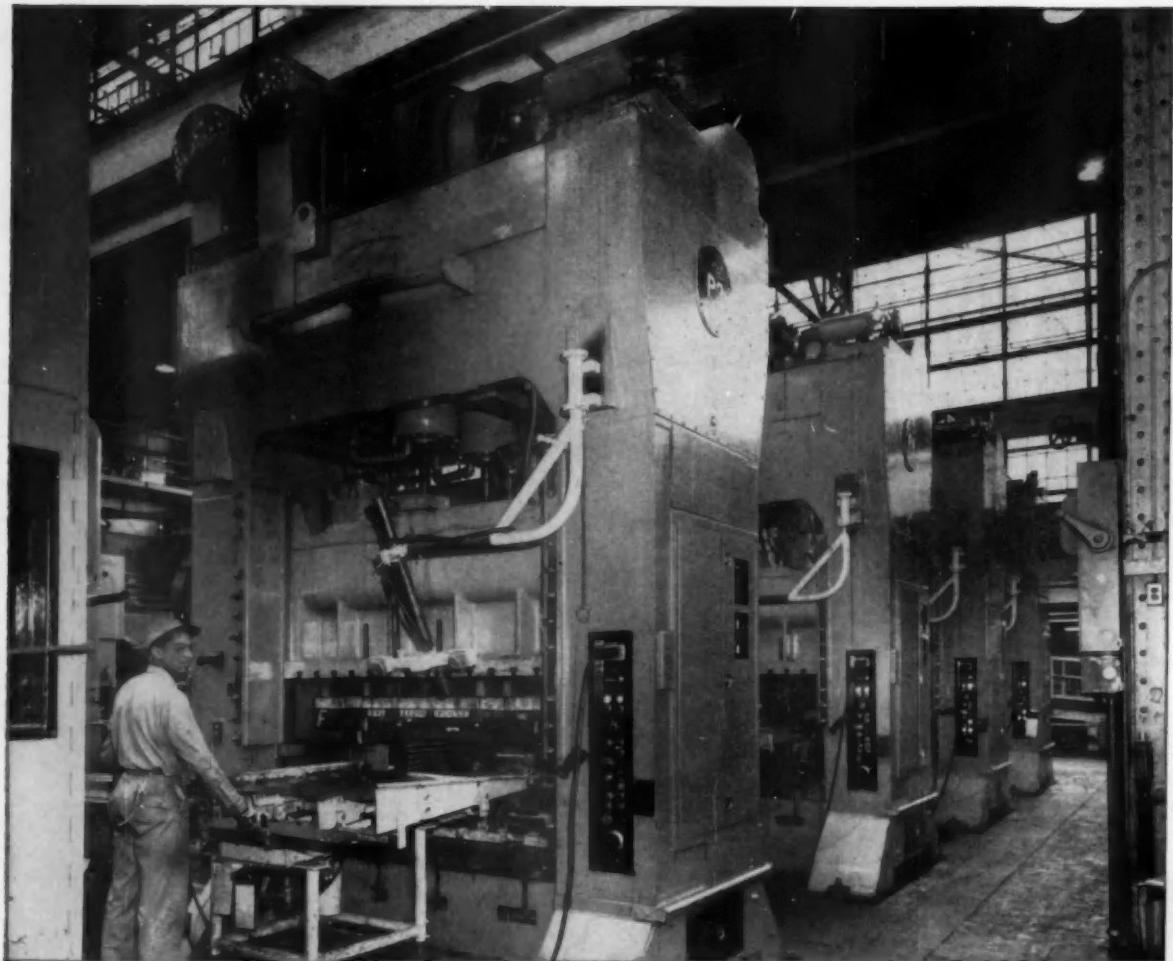
Today Jarecki Corporation is running valve covers on this new Clearing Transflex in their Grand Rapids Plant. Tomorrow? Who knows? Jarecki is a job shop with a wide variety of orders to fill and tomorrow may bring an automotive or appliance stamping run where delivery and quality are vital. That's why Transflex—Clearing's new concept of flexible automation—found immediate acceptance at Jarecki. Their new 600 ton press gives them the advantages of automatic transfer feeding, yet it's no single-purpose machine. Feed fingers change easily to accommodate different sized parts; the feed stroke is adjustable to take a wide range of jobs. Knockouts are universal and cushions also adjust laterally in the bed. If you have need for increased efficiency in your stamping operation, but have always thought of transfer presses as single-purpose machines, find out about Transflex. Call on a Clearing engineer for the full story.

## **CLEARING PRESSES**

THE WAY TO EFFICIENT MASS PRODUCTION

**CLEARING MACHINE CORPORATION** • Division of U. S. Industries, Inc.  
6499 W. 65th Street, Chicago 38, Illinois • Hamilton Plant, Hamilton, Ohio





# Dependable CLEVELAND Presses Hold Automotive Stamping Costs Down!

These four Cleveland Presses recently installed at a leading automotive stamping plant are further testimony of the dependable performance built into every Cleveland Press. Their selection clearly indicates their ability to produce low cost stampings on high production schedules . . . indicates their ability to "stand up" under the demands of round-the-clock operation.

You, too, can earn extra profits by investing in new, more efficient Cleveland Presses. You'll find that the instant response and exact control made possible with the patented Cleveland Clutch speeds operation . . . reduces rejects. Their extra rugged construction assures reserve capacity . . . lasting slide alignment for continued accuracy. One of the 11 specialized types of Cleveland Presses is sure to be your answer to greater stamping economy. Write or call today!



## POWER PRESSES - FABRICATING TOOLS

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Ever wish you could build your own presses? Danly does it for you... putting in the same extra strength you would to avoid down-time, working to closer tolerances as you would to protect your dies.

Danly Presses are built the way you want them. Take Danly's lubrication system, for instance... it's automatic to safeguard the press against human error and protects vital wear surfaces with oil to assure longer life.

You get what you want with Danly Presses.

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2100 So. Laramie Ave. • Chicago 50 • Ill.

Ask for your copy of *The Danly "Press Catalog"*... it gives the whole story on how Danly Presses are built for you. Write today.



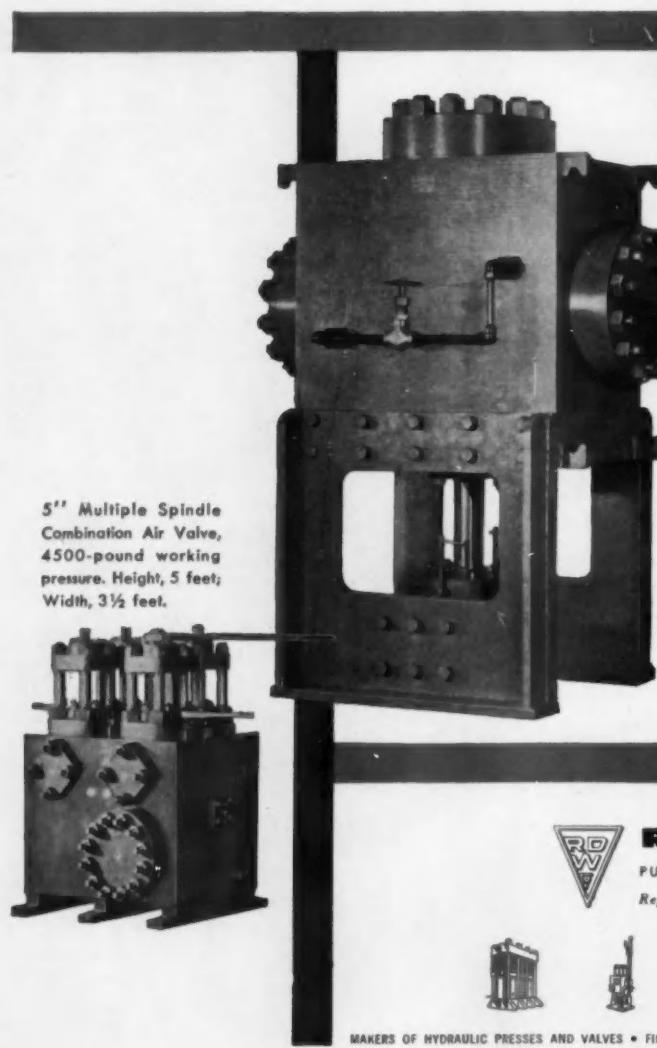
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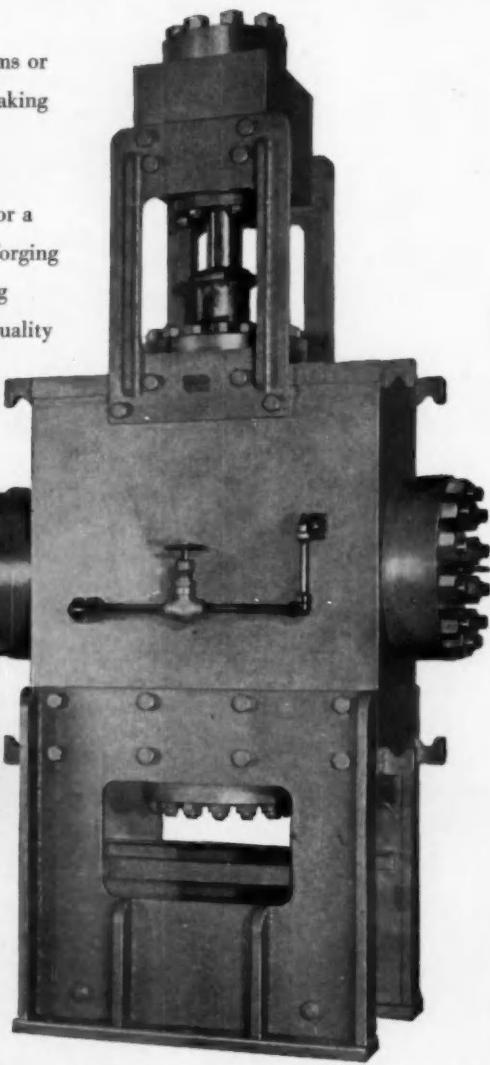


## SPECIALISTS IN HIGH-PRESSURE VALVES

When you need a *special* valve—for hydraulic presses and systems or allied hydraulic equipment—call on R. D. Wood. Besides making a complete line of standard valves, we design, engineer and manufacture highly complex valves of many types for many purposes. The three shown here are representative valves used for a hydraulic system, 4500-pound working pressure, for a 35,000-ton forging and forming press. In these, as in all R. D. Wood products, long life and efficient operation are guaranteed by precise design, quality materials and craftsmanship of the highest order. Send for complete details on R. D. Wood high-pressure hydraulic valves.



5" Multiple Spindle  
Combination Air Valve,  
4500-pound working  
pressure. Height, 5 feet;  
Width, 3½ feet.



Pilot operated 12" Balanced Stop Valve, 4500-pound  
working pressure. Height, 13 feet; Width, 6½ feet.

Pilot operated 12" Safety Shut-Off Valve, 4500-pound  
working pressure. Height, 9 feet; Width, 6½ feet.



**R. D. WOOD COMPANY**

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MAKERS OF HYDRAULIC PRESSES AND VALVES • FIRE HYDRANTS • CAST-IRON PIPE • GATE VALVES • GAS PRODUCERS • ACCUMULATORS

# *Processing Equipment Section*

BONDING

HEAT TREATING

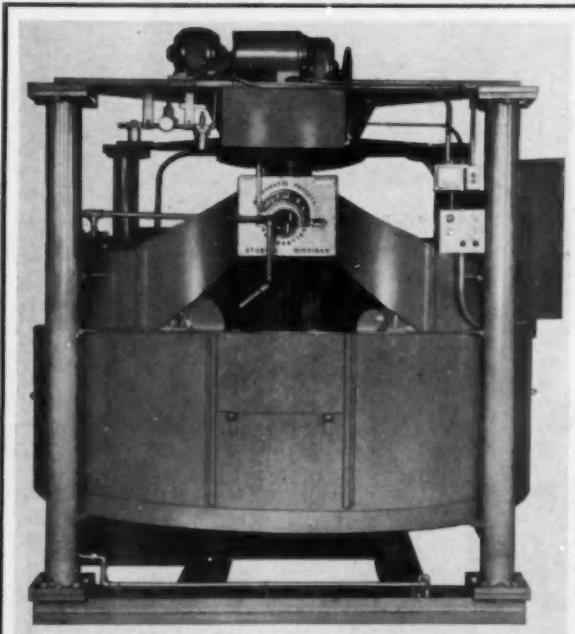
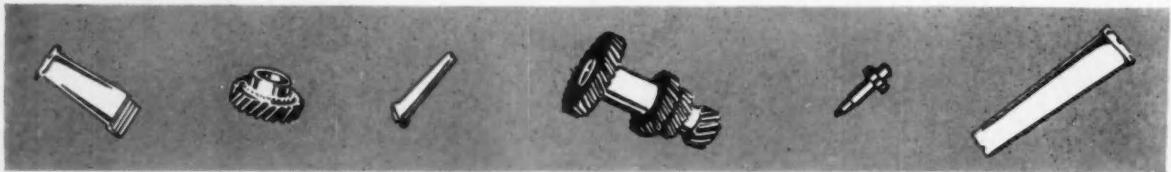
PAINTING

PLATING

AUTOMOTIVE INDUSTRIES

1956 MACHINE TOOL &  
PRODUCTION EQUIPMENT ISSUE

AI



No. MM-14-GD MECHAMATIC Machine \*\* This machine has been designed for concerns where high production runs of parts with critical dimensions require deburring and finishing.

### THE MECHAMATIC PROCESS

An economical method for burring and finishing ferrous and non-ferrous metals.

Fixture mechanical finishing for parts too delicate or too large to process in the conventional tumbling method.

Extremely low micro-inch surfaces can be produced while obtaining a uniform, controlled radius on exterior dimensions of precision parts.

MECHAMATIC Machines custom built for your specific requirements.

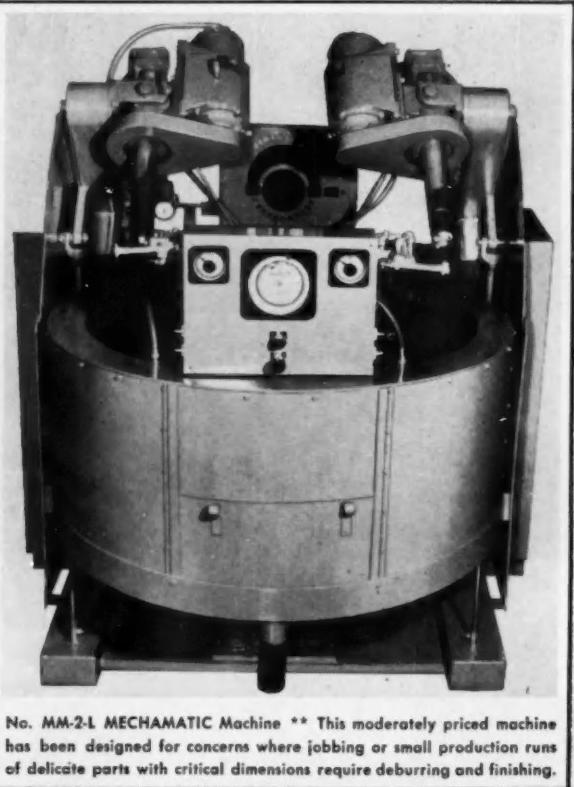
Please send parts for a MECHAMATIC Demonstration and request our brochure on the MECHAMATIC Process.



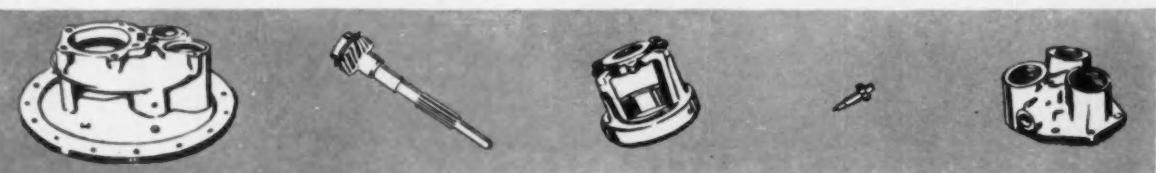
P. O. BOX 308

STURGIS, MICHIGAN

PHONE 388



No. MM-2-L MECHAMATIC Machine \*\* This moderately priced machine has been designed for concerns where jobbing or small production runs of delicate parts with critical dimensions require deburring and finishing.



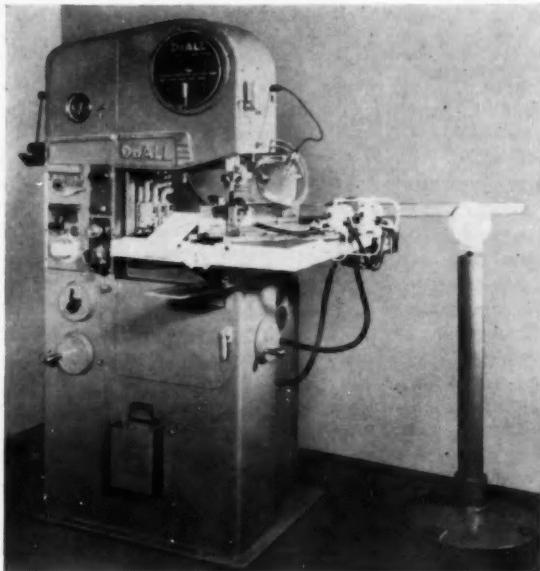
# AI

# Processing Equipment

FOR ADDITIONAL INFORMATION  
please use reply card on PAGE 163

## SECTION

DOALL COMPANY



### NORTON CO.

**TUMBLING MEDIA**—Two new barrel finishing media have recently been placed on the market. Tumblex "T" consists of Alundum vitrified bonded triangular shaped abrasive. This was developed to overcome the problem of the wedging of abrasive in parts being tumbled. Tumblex "N" is a natural material. This is being used with good results in finishing, and especially die castings where conventional abrasives frequently cut through the outside protective layer of the casting, exposing the porous structure beneath.

Advantages claimed for the new "T" molded shapes include: Uniform size and shape to prevent wedging; faster cut with no cutting compound required; maximum surface contact between abrasive and work parts; light weight per cubic foot; even

wearing; and chemical inertness.

The "N" type is especially suited for use on die-cast items. Because it cuts slower and has little breakdown, it reportedly does not mar the surface. It also brings up a bright color and luster.

Circle 113 on postcard for more data

**SPRAY GUN**—A gun that sprays plastic resins features an electric heat element, a special mixing nozzle, and a metering device. The firm announces that it will soon have available a dispenser attachment.

Circle 114 on postcard for more data

### MURRAY-WAY CORP.

**POLISHER**—No. 53 polisher with built-in so-called Floating Action will handle widths up to 24 in. Floating Action is designed to give an even buffing and polishing on the entire surface. It also simplifies the positioning of the workpiece once the proper pressure is established.

Circle 115 on postcard for more data

### MILLING PRODUCTS DIV.

#### CINCINNATI MILLING MACHINE CO.

**GRINDING FLUID**—Cimplus is a water-soluble, transparent concentrate that claims to give exceptional rust control at dilutions between 1:100 and 1:200. Though used primarily as a transparent grinding fluid, it can also be used to advantage when machining cast iron. And it can be used in Cimcool mixtures for the added rust control needed in hard water areas.

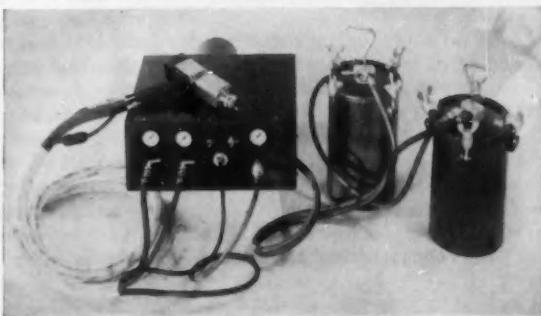
Circle 116 on postcard for more data

### RUBBA, INC.

**TANK COATING**—Rubbakote, a liquid rubber coating for preventing corrosion in electro-plating tanks, is said to be self-vulcanizing, unaffected by acids and alkalis, and to adhere to all types of metals. It can be applied by brush or spray and dries within 30 minutes after application.

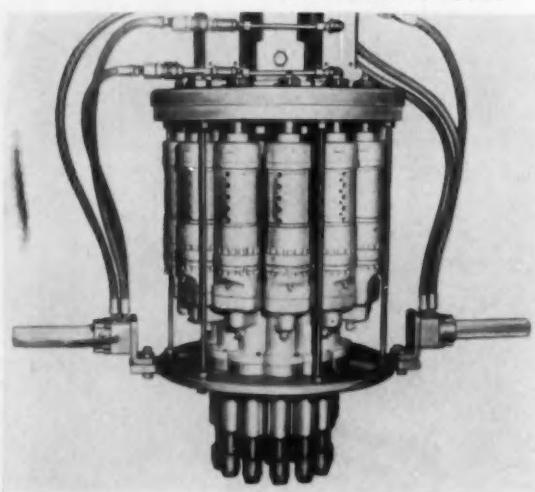
Circle 117 on postcard for more data

### KISH INDUSTRIES, INC.



# Processing Equipment SECTION

THOR POWER TOOL CO.



**NUTSETTER**—The multiple-spindle air tool illustrated is designed to tighten simultaneously a dozen nuts to predetermined torque. A principal feature of the unit is the offset spindle nutsetters, which are arranged in a compact 6½-in. working circle, for meeting the requirements of an automobile manufacturer in setting differential housing nuts.

Circle 118 on postcard for more data

## INDUSTRIAL ELECTRONICS, INC.

**ELECTRONIC CONTROL**—A new unit, called the MYKE-A-TROL, contains a sensitive electronic control mechanism for controlling quality during actual processing. It is designed for use with sensing elements, which are built into the gage heads for automatic measuring applications, such as gaging and sorting, weighing, pressure control, fatigue testing, inspection and thickness control.

The control is provided by means of two power relays which can be adjusted to operate at the desired control point and on any of four sensi-

control, where the first limit stops the grinding prior to finish size and sends the machine through the wheel dressing cycle and back to grinding; and where the second limit stops the grinding at the finish size and operates a counter. Inspection and sorting where the piece, if within limits are passed through undisturbed; or if they are outside limits, are sorted into oversize and undersize lots. Thickness control: where the plus and minus controls automatically adjust the rolls to maintain the desired thickness. Fatigue testing: where the first limit counts the stress cycles, and the second limit stops the process when the yield point is reached.

Circle 119 on postcard for more data

## ROTO-FINISH CO.

**FINISHING MACHINE**—An eight-door stationary fixture finishing machine designed primarily for coloring of aluminum castings has been announced. The new machine has a door on each flat of a single compartment cylinder. Fixture pads are attached to the octagon side walls of the compartment just inside the door opening.

Fixtures are in the form of grids, which fit attached pads. After a fixture is placed inside the cylinder, it is held in position during the processing operation by the pads and by pressure of the closed door pushing it firmly into the contoured pad. It is not necessary to remove processing media or solution when removing work load from the compartment.

Processing compartments vary in



tivity ranges. By internal switching, these relays can be made to operate on plus or minus tolerances; two successive plus tolerances; or two successive minus tolerances. A calibrated meter, located on the front panel and operated independently of the relays, indicates the quantity being measured.

Typical applications are: Grinding

size up to 48 in. long and 42 in. in diameter. The 32-in.-long size, used for coloring aluminum castings with steel balls, uses a 7½-hp drive equipped with automatic reversing electric controls.

Circle 120 on postcard for more data

## OAKITE PRODUCTS, INC.

**DEBURRING COMPOUND**—A mildly acidic compound for barrel deburring, descaling, and derusting, FM 184, is designed to replace raw acids in barrel operations, where alkaline materials and abrasives are impractical because of time limitations. It is also said to improve color of steel after alkaline deburring; to remove heat scale from steel; and to brighten brass, either with or without the use of abrasive media. The compound is said to have good foaming properties at the recommended concentrations of one to three oz to the gallon of water. It may be added dry to the burnishing barrel.

Circle 121 on postcard for more data

## GEO. T. SCHMIDT, INC.

**MARKING MACHINE**—Unit is designed to roll identification on peripheries of bearing races at rate of 1500 to 2500 per hour. Machine cycle is timed by a Geneva motion actuated by a hydraulic system.

Circle 122 on postcard for more data

## CIRCO EQUIPMENT

**DEGREASER**—A new compact vapor spray degreaser features unique circular construction and unobstructed tank walls with recessed condensate trough for effective solvent reclamation. This trough serves as a reservoir for distilled, pure solvent which is fed by means of a corrosion-resistant pump to a flexible hose and spray lance with fan-type nozzle.

Interior of the standard tank, as well as other critical surfaces, are zinc metallized for protection against corrosion. Stainless clad steel construction is available. Other advantages include easily removable, sturdy work rest; comfortable work height and removable cleanout door. All seams are electric arc welded and exteriors are painted in solvent resistant machinery gray.

The OP2-D30 economy model degreaser is available with steam or electric heating systems.

Circle 123 on postcard for more data

#### LINDBERG ENGINEERING CO.

**HEATING STATION** — For use in conjunction with control station and motor generator equipment of either 960, 3000, or 9600 cycles and ranging in power output from 30 to 300 kw, a new remote heating station is offered. It provides output flexibility for a wide variety of metal heat treating and fabricating operations such as tempering, annealing, selective hardening, normalizing, shrink fitting, stress relieving, hot forming, forging, and for brazing and soldering.

Capacitor racks provide ample mounting for a total of eight power factor correction capacitors. Water flow switches prevent operation of the remote heating station if the water pressure is inadequate to insure proper circulation of cooling water through the unit.

Circle 124 on postcard for more data

#### TINIUS OLSEN TESTING MACHINE CO.

**BALANCER**—The Vibrodyne model 55 balancer, for balancing large machine assemblies and power station installations consists of one strobe light, a standard portable pickup, and an electronic amplifier with necessary cabling, all of which are enclosed in a suitable carrying case. This unit is capable of differentiating between the comparative amplitudes and various frequencies found in rotating parts or the vibration set up by these rotating parts.

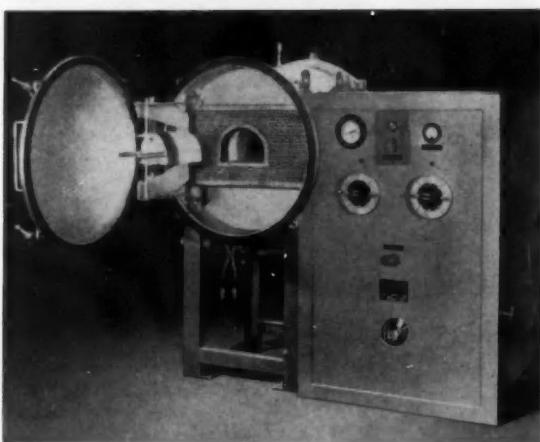
Circle 125 on postcard for more data

#### LAKE ERIE ENGINEERING CORP.

**DIE CASTING MACHINE**—Designed to be expandable, Series D die casting machines are available in capacities of 250, 450, 650, and 850 tons in either hot or cold chamber models. The machines can be furnished as a basic tool. As production requirements change, additional features can be added. All machines are equipped with a knuckled wedge cam toggle. This self-compensating arrangement automatically takes up clearances in dies caused by heat expansion. The knuckled joint eliminates shear stress on the pins when under locking pressure. Improved manifold valving reduces piping and joints. Flexible sequencing corepull valving eliminates the specialist ordinarily required to make changes from one sequence to

*Harper high-temperature vacuum furnace heats parts in a vacuum of 200 to 300 microns at temperatures up to 2500 F. Circle 126 on postcard for more data*

#### HARPER ELECTRIC FURNACE CO.



another, as in some other machines.

Machines equipped with a hot chamber injection unit feature a furnace that can be adjusted from the machine center line to positions below center. A water-cooled jacket around the injection cylinder ram reduces packing failure. Cold chamber units feature injection speeds of approximately 10,000 ipm with pressures of approximately 33,000 psi on the injected metal. The injection cylinder is adjustable from machine center line to positions below center.

Circle 127 on postcard for more data

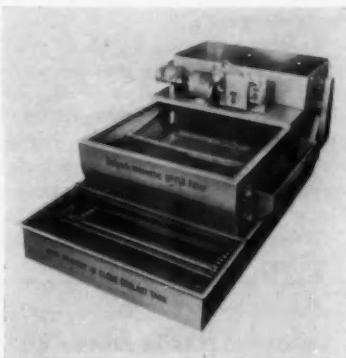
#### LINDE AIR PRODUCTS CO.

**SILICONES**—Six new organo-silicone compounds with reportedly unusual lubricating and solubility properties have been developed. Designated X-520, X-521, X-522, X-525, X-526, and X-527 these chemicals are offered for development purposes and are also available in commercial quantities. It is expected that they will find uses as special lubricants, as release agents for rubber and plastics; and as emulsifying agents or emulsion breakers. The new compounds are said to have excellent release properties, special thermal and viscosity stability and water repellency. In addition, they have lubrication and anti-wear properties that rival those of petroleum oils; they can be used as emulsion breakers for oil products, or as emulsifying agents under other conditions. Four are water soluble and two are easily soluble in both high and low aromatic solvents.

Circle 128 on postcard for more data

#### INDUSTRIAL FILTRATION CO.

**FILTER**—The Delpark Up-Flo filter with permanent, bar stock bronze screen has been redesigned to include the added feature of magnetic separation. This new method of magnetic separation makes use of a flat magnetic field on to which the liquids are

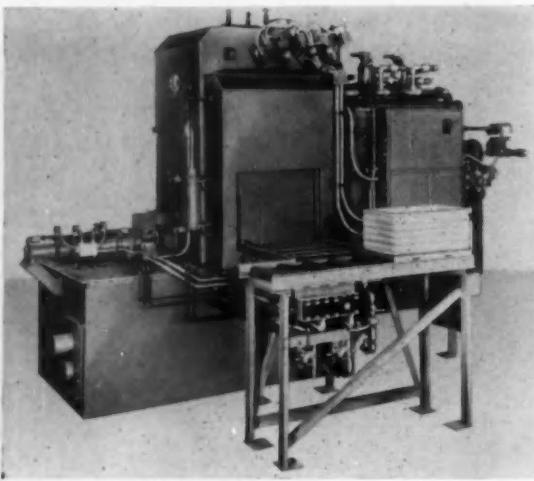


diffused, and uses the force of gravity to assist the magnetic field.

The Up-Flo action carries the liquids that have been exposed to the magnetic field up through the permanent 0.004 in. bar stock screen to remove particles such as abrasives which do not respond to the magnets. The liquid flows into a storage tank where settled particles smaller than 0.004 in. are removed by chain driven flights. The bar stock screen is cleaned by air shakers which shake embedded particles from the screen. This residue, with the ferrous particles, is removed by separate chain driven flights.

Circle 129 on postcard for more data

## Processing Equipment SECTION



### DOW FURNACE CO.

**BATCH - TYPE FURNACE** — The DOWmatic HC-800, first in a complete line of automated, controlled atmosphere, batch-type furnaces, automatically pre-conditions, loads and unloads the work chamber, and quenches the processed charge without operator handling. Featured on the HC-800 are pressurized operation, double elevator and automatic transfer mechanisms.

Assuming you start with a load in the work chamber and a pre-conditioned load on the upper elevator, the process operates as follows: At the end of the time interval for the load in the furnace, the inner door raises and the work is automatically placed on the double elevator. The

elevator descends, quenching the work load and moving the pre-conditioned load into position in front of the inner door. As soon as the elevator is down, the charge moves into the work chamber and the door closes.

The second stage in the process occurs when the quenching cycle is completed. The outer door automatically opens, allowing the "green" charge to move onto the upper elevator and the elevator raises. This moves the "green" charge into pre-conditioned position. The quenched work is automatically moved out onto the conveyor, the vestibule is automatically purged, and the outer door automatically closed.

Circle 130 on postcard for more data

### CHROME ELECTRO-FORMING CO.

**PRECISION CHROMIUM PLATING** — A self-contained unit for precision hard chromium plating of parts, tools, gages, etc., as well as for salvaging worn or undersized parts has been developed. Utilizing the Morey process this equipment can deposit under close control. Its throwing power makes it possible to deposit plate in grooves, recesses, shoulders, threads, etc. According to the manufacturer the resulting plate is extremely dense and close grained, will not chip or flake, and is guaranteed against peeling or chipping. Since plating thickness can be held to extremely close tolerances, dimensions of plated parts can be readily held within 0.0001 in., without requiring grinding or lapping

after plating. Success of the process lies in the close control of time, current density, and solution temperature. In addition, it employs a special catalyst that contributes to throwing power.

Circle 131 on postcard for more data

### WAGNER BROTHERS, INC.

**PLATING MECHANISM** — A fully automatic plating mechanism, the Platocrat, incorporates most of the work-saving features of custom-built automatic plating conveyors. Among its unique features are: a replaceable plating tank which enables the plater to change from cadmium to zinc in minutes, without tank cleaning operations. One tank is simply pulled aside and replaced with a spare tank. The

plating tank is electrically isolated from the rest of the mechanism to eliminate the possibility of stray currents. Three-point rail contact of work-carriers assures constant, dependable current flow. A versatile cycle allows as many as seven stations in both the pre- and post-plating cycle. Tanks are sectionalized at the factory to particular needs.

Racks are 12 by 6 by 30 in., provide big parts carrying area for higher production.

Circle 132 on postcard for more data

**ADDITIVE** — A liquid addition agent called Krome On can materially increase the throwing power of chromium plating baths, according to performance data reported by platers using the additive. It also furnishes a superior mist-inhibiting blanket to reduce spray and flue loss. Reduced drag-out also minimizes waste disposal problems.

Circle 133 on postcard for more data

### WALES-STIPPIT CORP.

**DUPLICATOR** — A pantograph-like mechanical device called a duplicator, is capable of locating holes in simple or complicated patterns and actuating the punching mechanism, from a template, by remote control. It is designed for use with the Wales Fabricator. As each hole is located the operator depresses the locator pin into the template aperture. This automatically closes a micro-switch in the locator assembly and actuates an air cylinder in the rear of the fabricator, which in turn operates the trip mechanism, effecting the punch.

Circle 134 on postcard for more data

### JOSEPH T. RYERSON & SON, INC.

**PLASTIC PIPE** — Rigid non-plasticized polyvinyl chloride pipe also suitable for use as a structural material is to be marketed as Ryertex-Omicron PVC pipe. The new type has no additives or fillers, for maximum resistance to attack by various acids, alkalies, salt solutions, alcohols and other chemicals. It will not support combustion. Pipe fittings and valves of the same material will also be available. Pipe can be sawed, threaded, solvent welded and heat welded. It will be supplied in Schedule 40 and Schedule 80 pipe sizes.

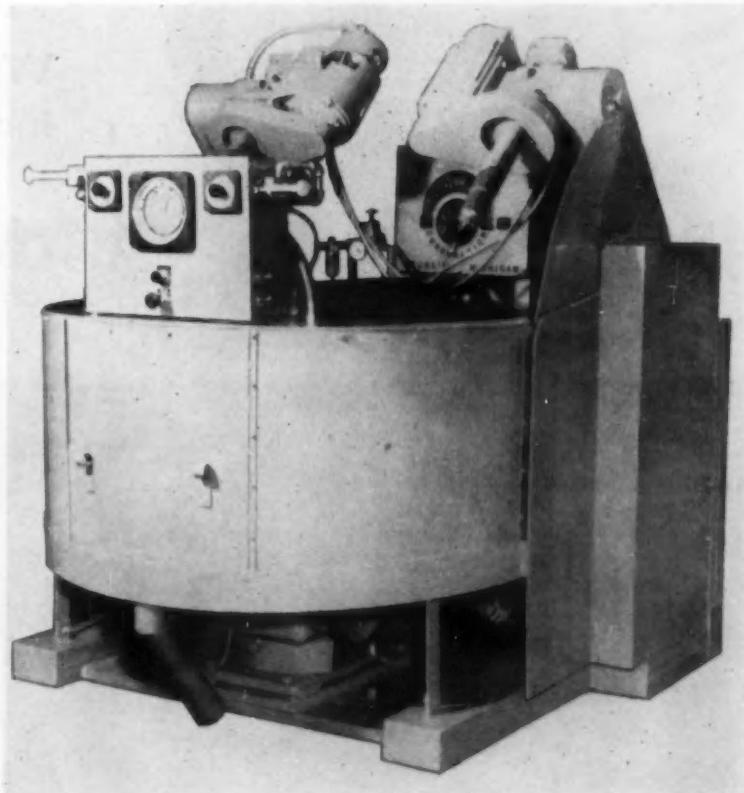
Circle 135 on postcard for more data

#### MECHA-FINISH CORP.

**MECHANICAL FINISHING** — The Mechamatic machine is an automatic tool, operating on precision standards, as a mechanical means to rapidly and uniformly deburr, radius, corner break and/or surface improve plastics, ferrous and non ferrous metals. This machine can consistently and uniformly radius or break edges, corners, etc., to as little as a thousandth of an inch. On the other hand, larger radii can be obtained and, in most cases, without dimensional changes on flat surfaces.

The Mechamatic method employs the principle of controlled, high speed, directional flow of small abrasive in the form of a wet slurry. This abrasive mass is contained within the retaining walls of a circular annular compartment rotating at a relatively high speed and consequently presents no return or recovery problem. Each part to be worked on is fixtured individually to a self-powered slowly rotating spindle, which can be pre-set at an angle in relation to the abrasive flow to best perform the operation, whether burring, radiusing or finishing.

Circle 136 on postcard for more data



#### BELLEVUE INDUSTRIAL FURNACE CO.

**RADIANT FURNACE**—A standard, radiant-tube, controlled atmosphere tool room furnace has been designed to fill the gap between the large production equipment and small muffle-type tool room furnaces. These units are available in a variety of sizes for operating temperatures ranging as high as 2100 F. The doors are power operated and designed with a special seal. The new burner system is said to overcome the objectionable tube roar sometimes found in this type of burner. A full flame curtain is built into the door sill.

Circle 137 on postcard for more data

#### PUROLATOR PRODUCTS, INC.

**SINTERED FILTER** — Capable of handling fluids ranging up to 1000 F, a new sintered filter can take flow rates comparable to any high temperature filter in existence with lower differential pressures and a better degree of filtration, according to company engineers. It removes particles as small as one micron in size from

a wide range of fluids, including such materials as nitric acid, hydrochloric acid, sulphuric acid, phosphoric acid and strong alkalies.

The one-piece sintered element can be made in a variety of diameters and lengths and its radial fin construction can be supplied in specified depths and numbers of convolutions to give extended area within a confined space. Varying flow rates are also available. Filters of stainless steel, monel and other metals can be made as required. Other features are its controlled permeability and uniform porosity which can be varied as to pore size desired. It can handle differentials of up to 500 psi.

Circle 138 on postcard for more data

#### AMERICAN METASEAL OF DETROIT

**SOLID LUBRICANT**—Meta-Film, a new solid lubricant, is reported to have proven successful on iron and steel, stainless, Stellite, special heat-treat alloys, non-ferrous alloys and platings. It is said to be an extreme pressure and temperature lubricant.

Circle 139 on postcard for more data

#### DISTEL TOOL MACHINE CO.

**BONDING MACHINE** — Automatic transmission bands are prepared for bonding on a roll form and cutoff machine which operates on both sides of each band. The Distel bonding machine has 42 stations and features thermostatic control at each station. Another feature of the machine is its one-shot lubrication system.

Circle 140 on postcard for more data

#### HANDY & HARMAN

**PRECISION STRIP**—Facilities for rolling precision thin metal strip are available. Thickness tolerances can be held as close as  $\pm 0.0001$  in. on strips of 0.001 in. thickness and up, according to the announcement. Maximum widths of four in. can be accommodated and after rolling, can be slit to any desired width.

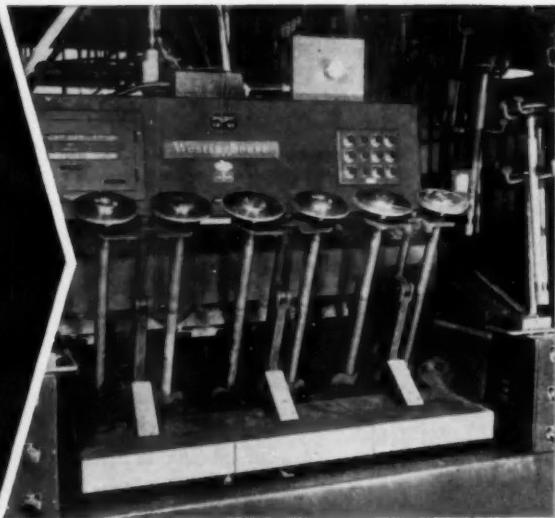
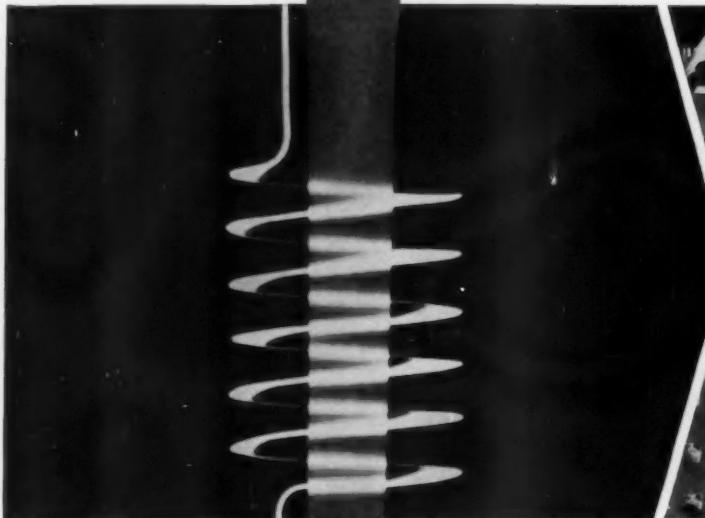
Because of the special processing controls and inspection procedures necessary to provide uniformly exact thicknesses, it is emphasized that precision rolling is not offered as a standard fabrication procedure.

Circle 141 on postcard for more data



Westinghouse  
induction heating

## doubles axle



1. A single operator surface-hardens 6 rear-axle shafts at each setup of this Westinghouse induction unit. Production per hour totals 210 shafts.

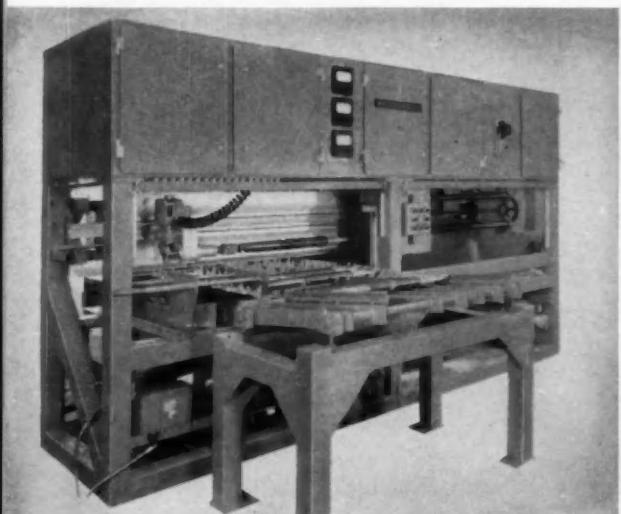


R. W. Cheek  
*Manager, Induction  
Heating Department*

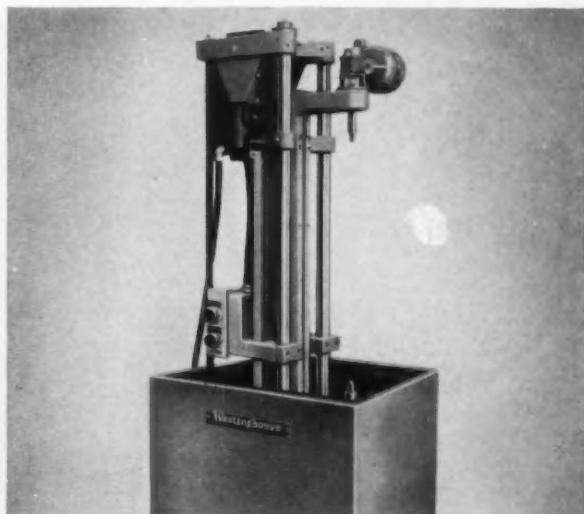
"Three different axle-hardening applications," reports R. W. Cheek, "show a slice of Westinghouse experience in solving production line heat-treating problems. Dependability of Westinghouse induction equipment, for example, protects production timing and holds maintenance to a minimum. Results are measured, too, in three important profit advantages."

1. Twice the axle fatigue life is obtained from lower cost, plain carbon steels. No more need for costlier alloys.
2. Lower carbon steels lengthen tool life . . . reduce machining and replacement costs.
3. Axle shaft distortion is minimized by rapid induction heating and quenching.

# fatigue strength . . . lowers cost



2. As many as 33 axle shafts up to 42 inches long and weighing up to 100 lbs. are surface-hardened by this Westinghouse induction equipment.



3. Westinghouse general-purpose induction scanner handles shafts up to 30 inches long, 80 lbs. weight, for surface-hardening and quenching.

Many other factors, such as savings in floor space, rapid start-up, and cooler more productive working conditions add to the high efficiency of each installation.

*A profit return for you?* Westinghouse induction - heating experience can show you production problems turned into profitable solutions for hardening, annealing, joining, or forging. Why not call on your local Westinghouse industrial heating sales engineer? He'll bring you expert problem solving and complete service. Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Penna.

J-10455

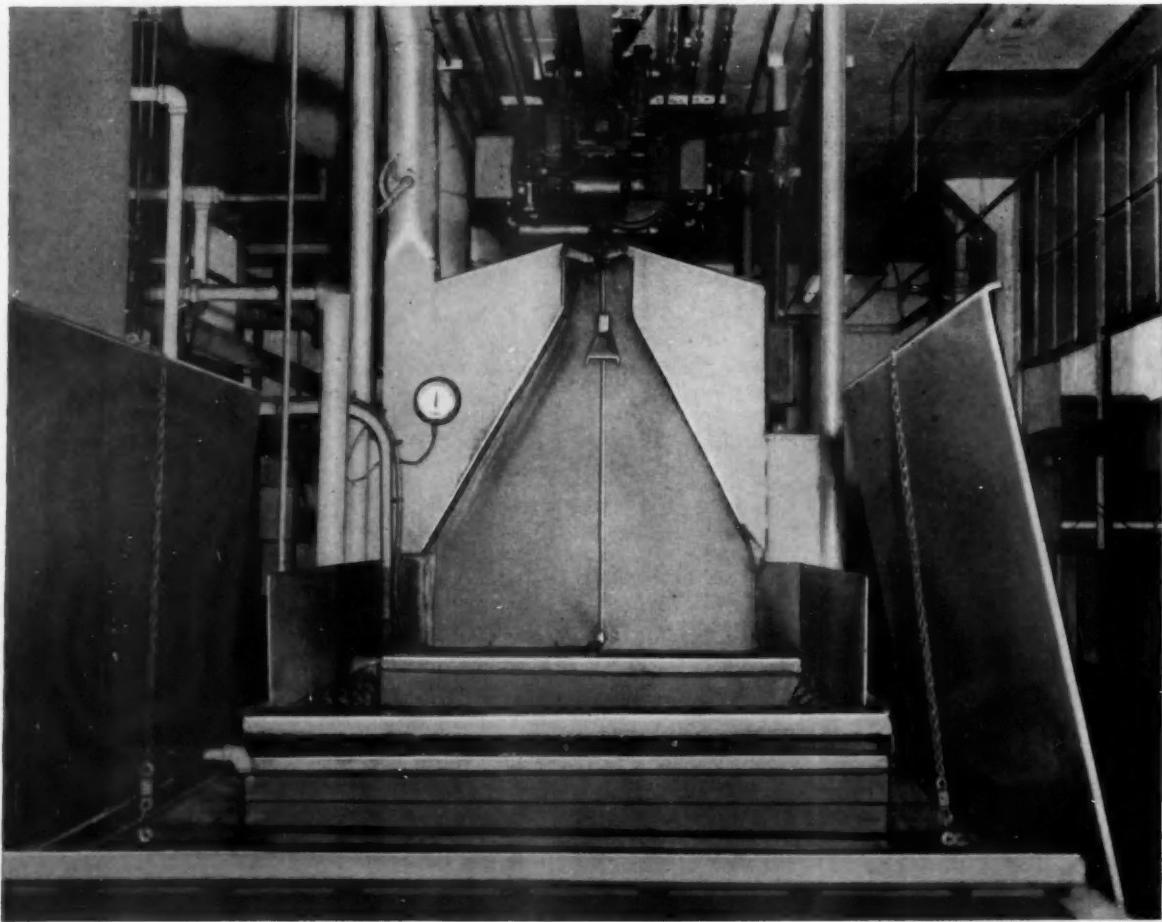
## The Westinghouse Heat-Treating Family

GAS • ELECTRIC • INDUCTION

AUTOMOTIVE INDUSTRIES, September 1, 1956

**WATCH  
WESTINGHOUSE!**

**COVER THE PRESIDENTIAL CAMPAIGN  
ON CBS TV AND RADIO!**



Work carrier in Thermoil-Granodine tank.

## THERMOIL-GRANODINE® MINIMIZES GALLING ON SEALED POWER PISTON RING SETS

**Iron manganese phosphate coating also lengthens life,  
combats scuffing and cylinder scoring, speeds seating**

Sealed Power Corporation has licked the problem of friction welding, galling and scoring by coating its piston ring sets with Thermoil-Granodine. This inexpensive and practical method of preventing metal-to-metal contact reduces galling, cuts wear by giving rings an iron manganese phosphate surface. Also it lengthens life, combats scuffing and scoring, and speeds the normal seating time of piston rings. It is corrosion-resistant and rustproof.

These advantages are largely due to

the lubricant-adsorbing characteristics of the Thermoil-Granodine surface. But they are also explained by the fact that the solution has an etching effect which produces a porous surface under the coating and leaves minute oil reservoirs in the metal when all traces of the coating have disappeared.

Write us for more information about the Thermoil-Granodine process for protecting friction surfaces, and the services offered by ACP in making it work for you—without obligation.

**AMERICAN CHEMICAL PAINT COMPANY, Ambler 24, Pa.  
DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.**



Process line designed and originated by Sealed Power engineers with the cooperation of ACP men for the processing of pistons, piston rings, cylinder sleeves, and thrust plates. The oval set-up permits loading and unloading at the same position—at one end of the machine.

# *Material Handling Section*

CONVEYORS

INDUSTRIAL TRUCKS

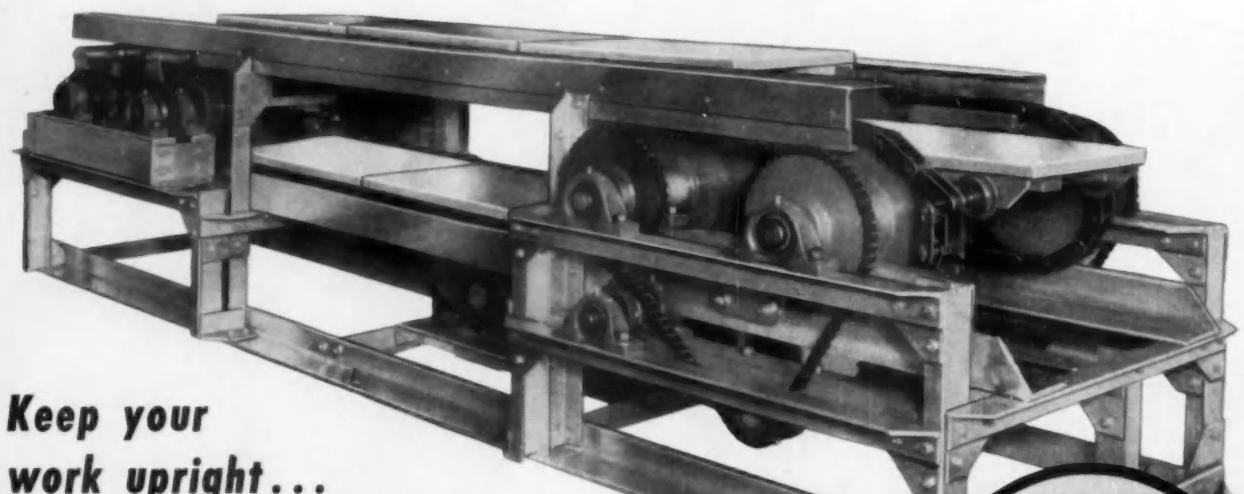
INDUSTRIAL TRAILERS

CONTROLS

AUTOMOTIVE INDUSTRIES

1956 MACHINE TOOL &  
PRODUCTION EQUIPMENT ISSUE

AI

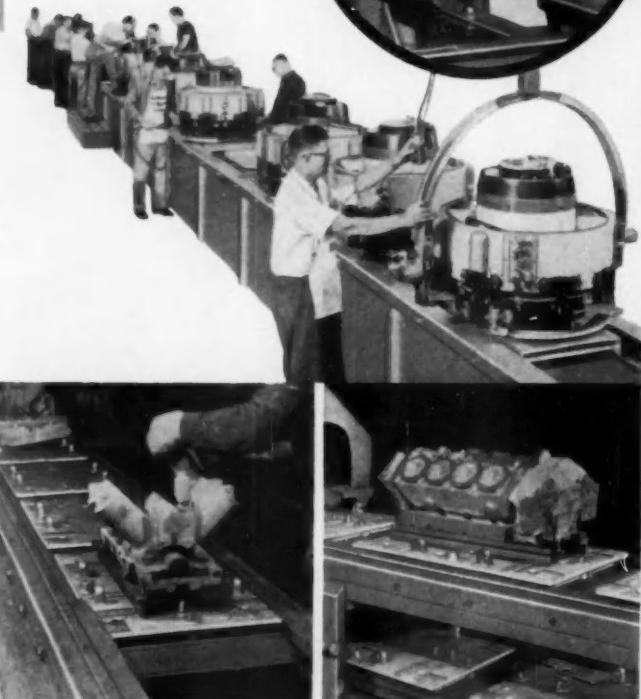


**Keep your  
work upright...  
use any size pallet  
or load in a minimum of  
space with this**

## **ANCHOR UPRIGHT-RETURN FIXTURE CONVEYOR**

- 1** Jigs or fixtures can be permanently mounted, remaining upright on carrying and return runs.
- 2** Jigs or fixtures may be of varied design to accommodate assembly, test or production operations.
- 3** No limit to pallet size or conveyor length.
- 4** Adaptable to light or heavy loads.
- 5** Inclines and Declines with pallet in horizontal position can be readily incorporated.
- 6** Pits are eliminated, in most cases, by the action of the pallets at the sprockets.

Pallets remain in horizontal position at head and tail ends of conveyor.



**ANCHOR** STEEL AND CONVEYOR COMPANY »»  
**CONVEYORS**  
DESIGNERS AND MANUFACTURERS



6906 KINGSLEY AVENUE

DEARBORN, MICHIGAN

# AI

# Material Handling

## SECTION

FOR ADDITIONAL INFORMATION  
please use reply card on PAGE 163

### WAGNER BROTHERS, INC.

**AUTO LOADER**—A completely automatic parts transfer mechanism can be adapted to automatic metal finishing mechanisms operating with an intermittent motion. Originally designed for automatic electroplating machinery, the loader also finds application in anodizing, phosphate coating, etching, electropolishing, oxide coating, painting, cleaning, etc. Size and weight of loaded racks no longer need to be limited by the worker's strength. This loader will accommodate a monorail conveyor system which operates on different planes.

All transfer mechanism is mounted on a reciprocating carriage, moving on rollers in a channel track. Cam followers attached to the lifting arms duplicate the eccentric contour of the side plates to raise and lower the lifting arms into the loading and unloading positions. The cycle is controlled by the limit switches of the automatic processing machinery, actuated by an hydraulic cylinder, or an



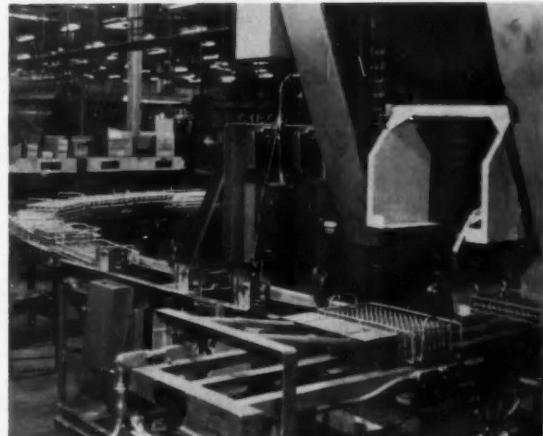
electric drive, to move in unison with the transfer cycle. Processed parts are unloaded from the automatic onto the monorail conveyor as, simultaneously unprocessed parts are loaded from the monorail onto the automatic.

Circle 142 on postcard for more data

**BASKET FEEDER**—Automatic basket feeder carries parts-laden metal baskets into entrance of conveyorized vapor degreaser. Automatic unloader at exit end returns baskets to gravity roller conveyor. Feeder section and unloader section are available as independent units for basket movement involving one-stage basket transference from one conveyor to another, or for simple flow-line switchover.

Circle 143 on postcard for more data

### CIRCO EQUIPMENT CO.



### MICHIGAN TOOL CO.

**GEAR AUTOMATION**—Automatic operation for 1800 series Shear-Speed gear shapers includes automatic loading, a new gear washer for cleaning gears prior to inspection and a three-way gear classifier and control panel. Various combinations using one or more of these components can be supplied.

The automatic size control unit built into the machine and working in conjunction with the classifier control panel regulates total infeed of the radial cutting tools.

When tools start to get dull, resulting in gears being consistently oversize, the control panel shuts down the gear shaper.

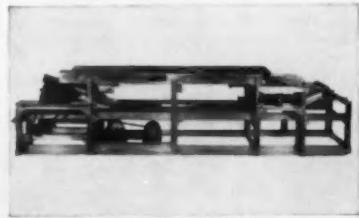
The automatic loader has magazine loading and uses both an indexing rotary table and a shuttle movement. It swings to one side for tool change. Finished parts are discharged into a chute. A magnetic chip separator removes chips automatically from the cleaning fluid in the gear washer. A clutch-brake unit installed in the drive system stops

the work ram reciprocating crank-shaft within one degree.

Circle 144 on postcard for more data

### ANCHOR STEEL & CONVEYOR CO.

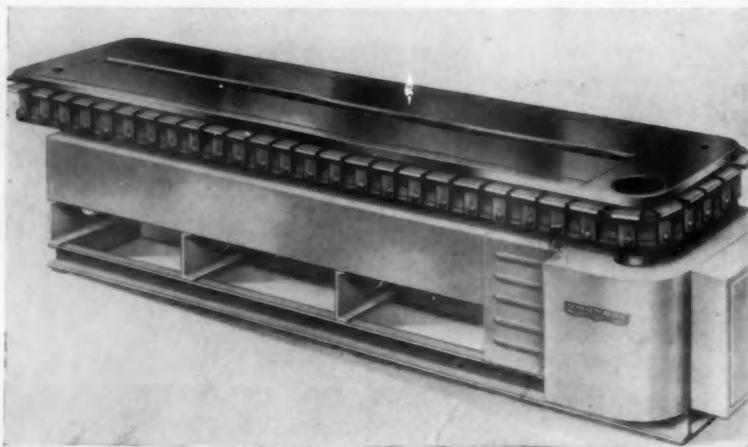
**Fixture Conveyor**—Unique conveyor features pallets which remain upright on both carrying and return runs. Jigs and fixtures of



varied design to accommodate assembly, test or production operations can be permanently mounted. There is said to be no limit to pallet size or conveyor length, and the unit is adaptable to light or heavy loads.

Circle 145 on postcard for more data

## Material Handling SECTION



### SWANSON TOOL & MACHINE PRODUCTS CO.

**TRANSFER MACHINE CHASSIS** — Auto-Tran straight-line type indexing chassis provides a standard unit for application to both automatic and semi-automatic assembly operations. It is, however, designed with accessible faces for mounting various types of operational devices for drilling, tapping, staking, etc. The unit is offered with 48 to 72 carriers; 3, 6, 9 or 12 in. index travel, and with either vertical or horizontal mounting surfaces.

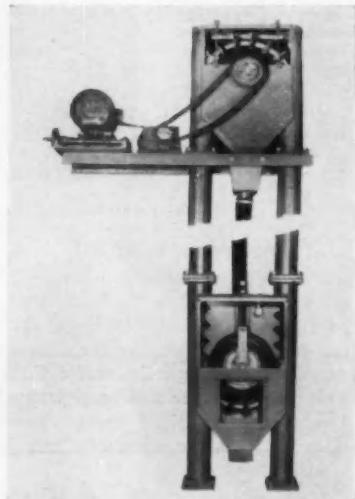
Work carriers, attached to a double roller chain, have ball bearings mounted in both horizontal and vertical planes, guided in tracks mounted on the chassis frame. A smooth index is provided by a cam indexing unit which drives a sprocket incorporating a pin clutch. This feature provides easy alignment of operational devices and tooling. A Warner electric clutch brake, with standard electric motor drive, provides flexibility in operational cycle control.

**Circle 146 on postcard for more data**

### HAPMAN CONVEYORS, INC.

**CONVEYOR ELEVATOR** — Hi-Lift Cableveyor-Elevator conveys free-flowing materials such as welding flux, foundry sand and chemicals. The unit consists of standard steel cable carrying concave stamped or cast metal buckets, uniformly spaced by heavy springs under compression. For some applications, the springs are covered by synthetic tubing spacers under compression for sealing out conveyed materials. Pneumatic rubber-tired drive and take-up wheels are used,

eliminating sprockets. A head with variable speed drive is available. Both cable and tubes are built in standard section lengths, and elevators can be assembled to almost any practicable



height. Either center discharge chute for low speed of 60 fpm or side discharge for high speed operation up to 250 fpm is obtainable.

**Circle 147 on postcard for more data**

### NORTON CO.

**GRINDER LOADER** — A turret type device automatically loads workpieces between centers and removes the pieces when ground. With variations to suit conditions it can be adapted to a wide variety of small parts that can be rolled by gravity on inclined rails.

The device supports the work near both ends. A number of workpieces may be placed on the loading rails by

the operator or fed to the loader from a conveyor. Latches placed along the loading rails separate the parts and operate to release a single piece at a time to the turret.

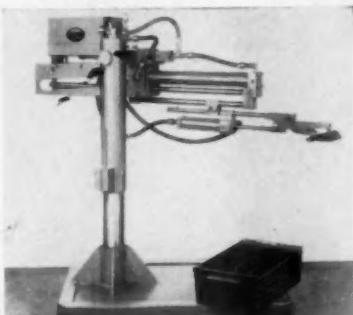
The turret is carried on a swinging arm, the motion of which is controlled by a small hydraulic cylinder and piston operated by a valve in the operating cycle of the machine. When a workpiece is received in the turret, the arm swings the turret to locate the piece in line with the work centers. As the work centers enter the center holes the piece is raised to clear the turret fingers and permit free rotation.

After the piece has been ground, the turret arm swings upward and a latch indexes the turret so that the piece rolls onto the inclined unloading rails. The turret arm continues its upward motion to the loading position where the turret receives the next piece. Latches along the unloading rails automatically accept and release one piece at a time keeping the pieces separated.

**Circle 148 on postcard for more data**

### SAHLIN ENGINEERING CO.

**PRESS UNLOADER** — Series 3000 Iron Hand can be moved quickly from press to press and is easily adjusted for different jobs. It is also recommended for use with back-gearred presses where the gearing prohibits the mounting of standard overhead Iron Hands. The series 3000 Iron Hand has the same jaw, air cylinder and controls as the standard overhead model. The unit is mounted on a heavy



steel base on wheels. It can be adjusted up or down on its vertical post to suit the die height, and swiveled into unloading position. Since the jaw travel is in a straight line, the unloader can remove small parts at high speeds.

**Circle 149 on postcard for more data**

#### SPECIAL ENGINEERING SERVICE, INC.

PUNCH PRESS FEED — Hydraulic gripper type punch press feed is available for handling stock up to 36 in. wide by 3/16 in. thick for feed lengths up to 36 in. long. All models are adjustable to take narrow width stock, and for infinite feed stroke length from zero to the maximum of the unit.

Feed stroke is adjusted by a small hand wheel which can be adjusted while unit is operating. There is no tie-in with the press.

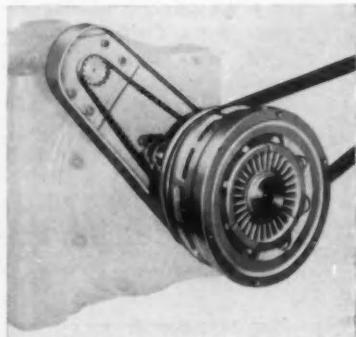
A limit switch mounted on the press and actuated by any moving part of the press or die timed with the ram, energizes a solenoid which starts the feeding cycle. Stock is fed on the up-stroke of the press.

Circle 150 on postcard for more data



#### MECHANICAL HANDLING SYSTEMS, INC.

CONVEYOR, DRIVE — Featuring flexibility of operation, a line of power-and-free systems includes light-weight overhead trolley conveyor



ors, power transfer stations, gravity switches, and carriers. Illustrated is one of the infinitely-variable-control drive units.

Circle 151 on postcard for more data

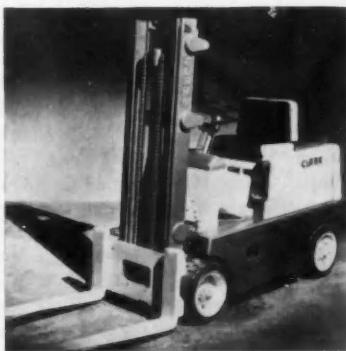
plungers. Plungers are hydraulically balanced, both axially and radially; when the plungers are in the neutral position the pump is unloaded. Rated capacity is 30 gpm, recommended maximum operating pressure is 2000 psi.

Circle 152 on postcard for more data

#### CLARK EQUIPMENT CO.

FORK LIFT TRUCK — The Clarklift Line features Hydratork Drive with a new axle and brake, which are said to permit nonstop forward-reverse shifting and close control of both full-load and no-load inching operations. Also included are self-adjusting brakes, a balanced swing-up hood, and emergency fuel tank. Control is by two levers mounted on the steering column, one for direction and the other for lift-lower and forward-reverse tilting. Comparable to the deluxe models of automobile makers,

they are offered as one of two lines. Gas models with capacities ranging from 2000 to 5000-lb are available



now; electric models and gas models of higher capacity will be added shortly.

Circle 153 on postcard for more data

#### KALAMAZOO DIV., NEW YORK AIR BRAKE CO.

CONTROL VALVE — Series V-32 directional control valve for fluid power circuits is designed especially for materials handling applications.

The unit is equipped with integral pilot-operated relief and unloading valve, and with a parallel circuit affording simultaneous connection of the pressure port to any number of cylinders. Five models are available, offering from two to six operating

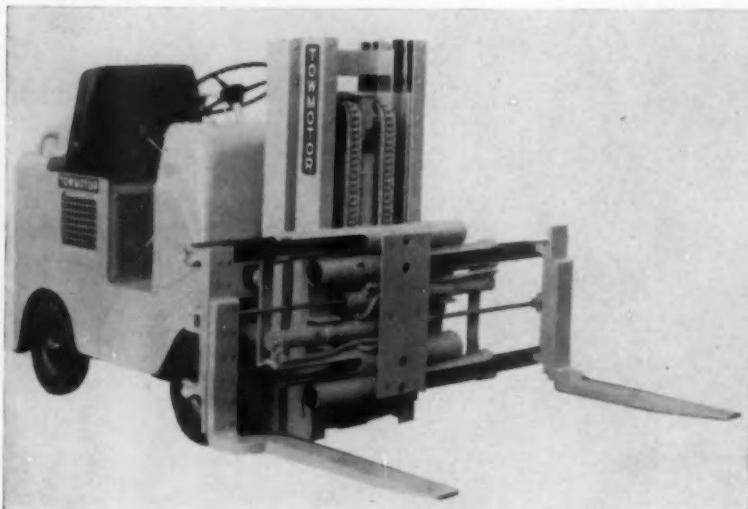
CLEATED BELT — Designed to carry loads up steep inclines where a non-ridged conveyor belt would allow slippage, a cleated belt can be obtained with rubber cleats in heights of  $\frac{3}{8}$ ,  $\frac{1}{2}$ , 1 and  $1\frac{1}{2}$ -in. It is also available in a range of plies, cover thicknesses, widths, and rubber compounds

Circle 154 on postcard for more data

#### GOODYEAR TIRE & RUBBER CO.



## Material Handling SECTION



### TOWMOTOR CORP.

**TRUCK ATTACHMENT** — Multi-purpose hydraulic clamp and offset fork attachment for lift trucks are said to provide quick adaptability for handling the diverse size, shape and character of products and raw materials which call for versatility in materials handling equipment. With the accessory, the lift truck carriage can be adjusted laterally to handle heavy loads of varying size and shape. This makes it suited to operations where a lift truck must be used interchangeably as a clamp truck and a fork lift truck, and to applications where a variety of different widths of pallet loads are handled. Hydraulic actuation of the clamp provides for quick adjustment of the forks.

The multi-purpose clamp and forks are shown attached to a Model 500 fork lift truck equipped with a double telescopic mast consisting of a primary and a secondary mast. Controlled separately by hydraulic levers located at the driver's position, the secondary mast can be used for low headroom stacking; while in a high stacking operation, both are used.

The Model 500, available with gasoline, LP-gas or Diesel power, has a lifting capacity of 5000 lb at 24-in. load center.

Circle 155 on postcard for more data

### WRIGHT HOIST DIV., AMERICAN CHAIN & CABLE CO., INC.

**CRANES, HOISTS** — Line includes an electric underhung motor-driven crane which features flangeless

wheels, a top-running motor-driven crane with end trucks designed for easy maintenance, and a variety of hand-operated chain hoists. The two-speed, Speedway electric hoist has one speed for normal lifting and a much slower speed for spotting, and is said to parallel the sensitivity of control of air hoists.

Circle 156 on postcard for more data

### MICHIGAN CRANE & CONVEYOR CORP.

**CHIP CONVEYOR** — Self-cleaning all-steel drag flight conveyor has each flight or bucket drag on a steel pan



when elevating. When it returns, it moves above the same pan, dropping any of its load of wet chips that may have adhered to the flights. In one installation, from automatic screw machines to gondola cars, this eliminated the necessity of floor cleaning.

Circle 157 on postcard for more data

### PHILADELPHIA GEAR WORKS, INC.

**CONVEYOR DRIVE** — HVUT speed reducer has been developed specifically for application to conveyor drives and features mounting flexibility, wide range of output speeds and rugged construction. It may be mounted in any one of six different positions. The output shaft when mounted in the vertical-down position is a typical installation for overhead conveyors such as used in the automotive industry. The "dry well" feature of the reducer provides a completely dry area around the output shaft and avoids the possibility of oil leakage down the shaft. A large volume of oil circulates to keep the reducer cool; bearing in dry well is grease-lubricated. The output shaft vertical-up is employed for tow line and other types of conveyors. Dust-proof housings make pit mountings feasible.

Utilizing the standard 50 to 1 worm gear reduction, total ratios between 50 to 1 and 1800 to 1 can be realized with standard stock helical gearing, while lesser or greater total ratios are available with special worm gear sets. Speed change is said to be easily accomplished by simply replacing the helical change gears with the desired ratio.

Mechanical-electrical shut-off device for torque or overload control is optional. It protects both the reducer and conveyor by instantaneously stopping the conveyor system at the moment any overload occurs. This control is adjustable in the field to suit varying service conditions.

Circle 158 on postcard for more data

### FEEDALL, INC.

**BAR, TUBING UNLOADER** — Unloads pieces of bar or tubing from a production machine to a high tote box. The unloader has one stationary tower and one movable elevator so that it can be adjusted to handle pieces from 3 to 12 ft in length and from 1½ to 3-in. in diam, at a variable rate of speed.

In operation, the bar or tubing flows from the production machine into a vee-shaped trough which is tripped to one side as the piece leaves the machine. The piece falls down an incline until it is picked up by the cleats of the two elevating conveyors, which operate in unison. It is then lifted to the top of the conveyors and over to the other side of the unloading machine, where it rolls into the tote box.

Circle 159 on postcard for more data

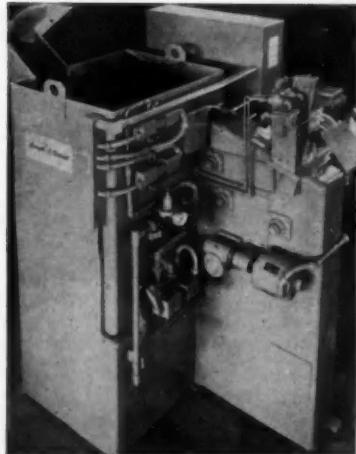
#### MAGLINE, INC.

**PALLET DOLLY** — Lightweight dolly, of all-magnesium construction and weighing 31 to 42 lb, is said to contribute to faster, more economical material flow in freight car loading or trucking operations. The dollies are fabricated of welded magnesium channels and are fully stress-relieved. Other features are: rounded corners, and 3½-in. diam rollers equipped with ball bearings and steel axles. Roller spacing may be even, or staggered, as required. The pallet dollies are available in six standard sizes and in capacities of 2000 or 4000 lb. Special sizes may be had on request.

Circle 160 on postcard for more data

#### CARGILL DETROIT CORP.

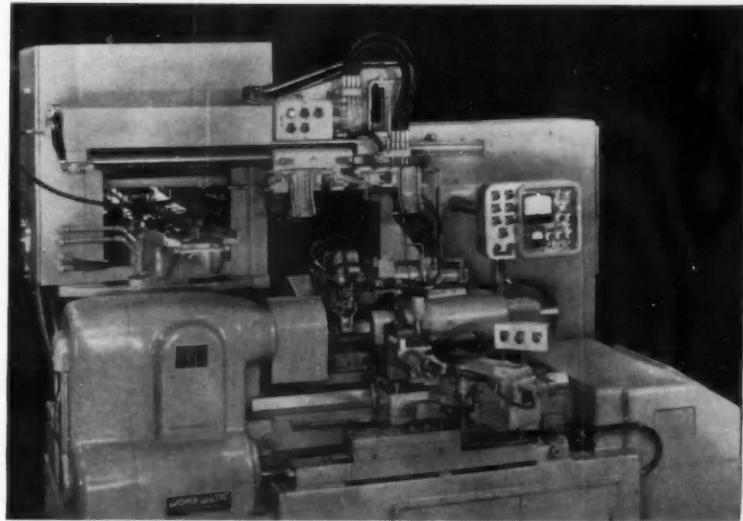
**HOPPER FEEDER** — Receives parts, such as gear blanks, bearing races, pistons and screw machine products, in bulk, with random orientation; and discharges them, orientated and aligned, to the following machine on demand of the latter. Its design, which incorporates a slicer bar, is standardized so that no basic engi-



neering changes are said to be required to couple the feeder to a range of machines, processes, and parts sizes and shapes.

Where desired, the unit can be equipped with a conveyor system which will elevate parts up to 15 ft and deliver overhead to a machine as far away as 50 ft. The hopper feeder can also be equipped with a gage to reject parts that do not meet specified tolerance.

Circle 161 on postcard for more data



#### MONARCH MACHINE TOOL CO.

**LATHE LOADER** — Hydraulically-actuated automatic loading mechanism is available for Model 21 Monamatic lathe. Incorporating a gravity chute and a shuttle conveyor, the loader automatically positions each piece between the work centers of the machine, triggers the Multicycle programmer controlled four cut automatic work cycle of the lathe, and finally removes each finished piece. No manual control by the operator is required for any portion of this oper-

ating sequence, and the loading mechanism and the lathe function continuously as long as a supply of new workpieces is maintained in the loader's conveyor chute.

The lathe is a standard model with an air-operated tailstock unit actuated by the loader control circuit. Special safety switches are incorporated in the tailstock to prevent lathe operation if the workpiece is not properly centered by the loader mechanism. An air-operated chuck is used.

Circle 162 on postcard for more data

#### CAMPBELL MACHINES CO.

**WIRE MESH CONVEYOR** — Hot or cold material can be handled with a line of conveyors having steel wire mesh belts. Low end of the conveyor, on casters, is adjustable from eight to 20 in. from the floor; upper end height ranges from 32 to 72 in. de-

pending on length. The angle of incline is 30 deg.

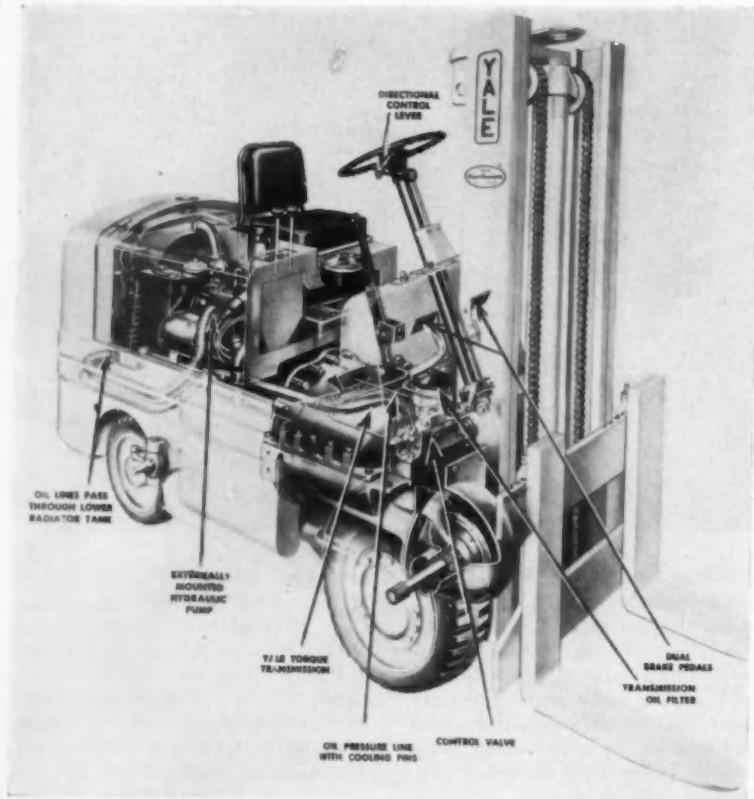
Belt and side guides are replaceable. A variety of weaves and cleats are offered, as well as various motor voltages.

Circle 163 on postcard for more data

Campbell - Veyor conveyor of steel wire mesh



## Material Handling SECTION



### YALE & TOWNE MANUFACTURING CO.

**LIFT TRUCK**—Model KGA-51 fork trucks feature torque converter transmission, self-adjusting brakes, power steering, and high travel and lifting speeds. A multiple disk clutch hydraulically operated by a mechanically actuated control valve selects for-

ward or reverse travel. Movement of the direction control lever to either forward or reverse position actuates the control valve to apply constant hydraulic pressure against the clutch plates, which then engage either the forward or reverse constant mesh gear train.

Inching control is said to be engi-

neered to permit smooth maneuvering of the truck at times when high engine speeds are necessary to perform lifting or attachment operations. Inching is accomplished through the brake pedal by means of a hydraulic connection from the master brake cylinder to the transmission control valve. As the brake pedal is depressed, it actuates the control valve automatically reducing hydraulic pressure against the engaged clutch, thereby slowing the transmission gear speed without affecting engine speed. This provides for close control of travel or "inching." Further depression on the clutch pedal reduces pressure on the clutch plates to the extent that gear rotation is completely stopped and the hydraulic brakes are applied.

Circle 164 on postcard for more data

**INDUSTRIAL TRAILER**—Standard 8000-lb capacity industrial trailer gives the advantages of longer length with increased carrying area and an improved trailer hitch. It has a one-piece checkered steel plate carrying platform of 128 in. in length and an overall length of 135% in., and is available in platform widths of 38 and 48 in. The hitch is a simplified device which is connected or disconnected on either end of the trailer by removal of a single pin. Four wheel steer is accomplished through levers and connecting rods which assures perfect trailing in a train. The trailer is also available with an oak platform, steel bound with armored ends.

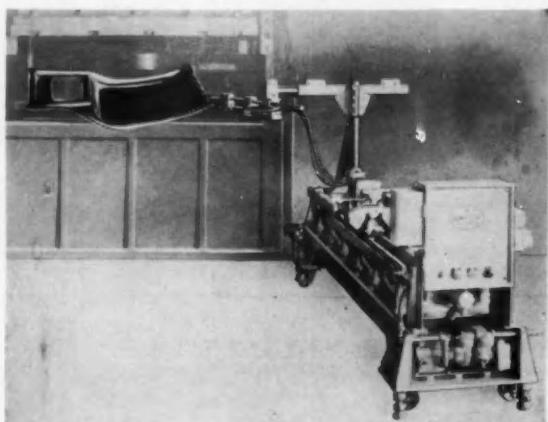
Circle 165 on postcard for more data

### HAMILTON AUTOMATION, INC.

**PORTRABLE PRESS HAND**—Mobil-  
ity of a press hand permits it to be  
moved from one press to another as  
conditions require. It pulls parts  
from the die press fully automatically  
and at a rate of up to 30 spm. Oper-  
ated by the compressed air, the  
unit is controlled by two switches. In  
operation, the hand travels in to pull  
the part from the press, then travels  
back, holding the part under pressure  
while the entire arm support moves  
backward from the press on a sliding  
track. When the arm support reaches  
the end of the stroke, the hand re-  
leases the part and the support moves  
toward the press again to repeat the  
process.

Circle 166 on postcard for more data

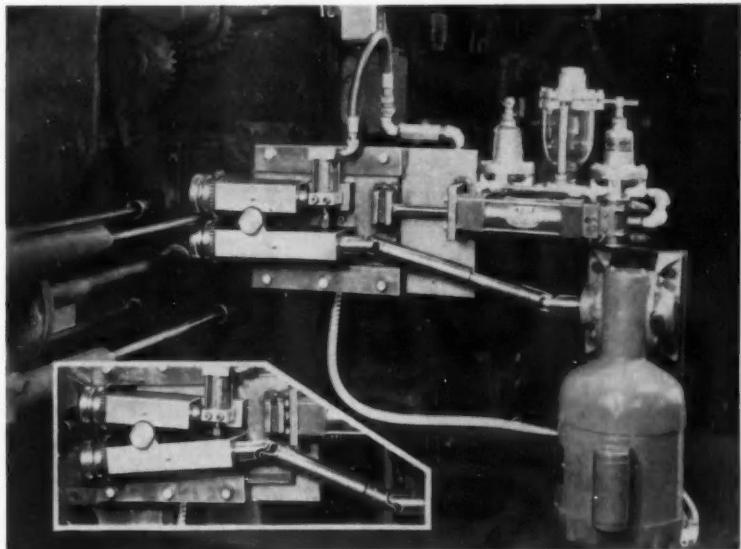
*Hamilton press hand is portable for flexibility of application. It is available in three sizes, with 24, 36 and 48-in. strokes.*



**HANSFORD MANUFACTURING CORP.**

DIE HANDLER—Model 1014 die handler can handle dies or molds measuring 36 by 75 in. weighing up to 6000 lb. Its top platen is of cast menehanite and is raised and lowered with heavy precision lead screws, driven by a two-hp electric motor mounted in the base. Under power, the top platen rises at the rate of 12 in. per minute. Fine adjustments in position can be made with an auxiliary hand crank.

Circle 167 on postcard for more data

**PALMER-SHILE CO.**

DROP BOTTOM BOX—Corrugated all-steel welded drop bottom boxes can be used either with positioning stand or for controlled dumping by fork truck.

When used on a positioning stand, the legs at the bottom of the box engage the stand and the drop bottom automatically opens. When used for automatic dumping by fork truck, a reinforced box hanger engages the mast of the fork truck. Safety corners prevent box shifting during stacking or when two or more are transported. Corrugated rolled steel legs on the bottom of the box lifting plate are reinforced with steel plate. Boxes also have lapped ends, replacing butt welds. Boxes have fourway entrances and are built from any gage steel to customer dimension and capacity specifications.

Circle 168 on postcard for more data

**HARTFORD SPECIAL MACHINERY CO.**

FEED UNIT—Model 405 way type hydraulic feed unit, designed to give balanced thrust, is said to provide positive control of rapid traverse, fine feed and depth. Depth will repeat within 0.0005 in. The flange is designed to simplify mounting and aligning of multiple spindle heads, and the 15 in. stroke permits tool change clearance. In its position above the ways, the power cylinder is claimed to be more accessible for maintenance, and the hydraulic control panel can be mounted on either side of the unit. A separate floor-type power pack supplies the hydraulic power.

Thrust of the unit depends on hydraulic pressure. At 1000 psi the four-in. hydraulic cylinder provides 12,000 lb thrust. Feed rate is infinitely variable from 0 to 24 in. per minute, rapid advance is 8 in. per second and rapid return is 5 in. per

**ROLL-O-MATIC INDUSTRIES**

SCREW MACHINE FEEDER—Stock feeder provides for reloading a multiple-spindle automatic screw machine without stopping the machine each time the previously fed stock is used up. The device includes a pair of rollers which are adapted to engage stock between them to feed the stock to a screw machine spindle which is aligned with the rollers. The rollers are disengaged from the stock before the machine indexes to its next position so that they will not interfere with the indexing operation.

After the machine has indexed, the rollers are moved into engagement with the stock in the next spindle which has become aligned with the rollers. This operation is repeated each time that the machine indexes.

The rollers rotate in such a manner as to feed additional length of stock to the spindle. When the stock reaches the stop a collet automatically clamps on the stock. The cycle of operation is then repeated. The device can feed out approximately three times the length the machine is designed for.

Circle 169 on postcard for more data

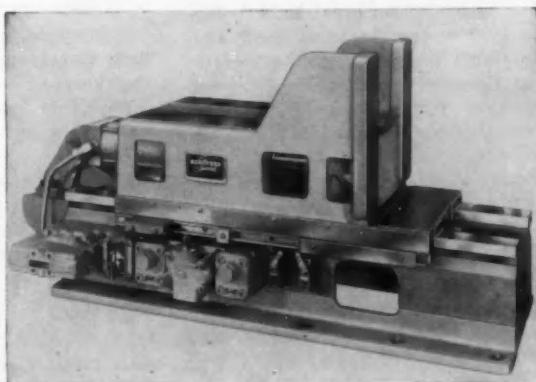
second. Rapid advance and feed stroke lengths are adjustable to suit, by repositioning control dogs.

Multiple spindle drive motors up to 20 hp, 1800 rpm can be mounted on the saddle. Precision hardened and

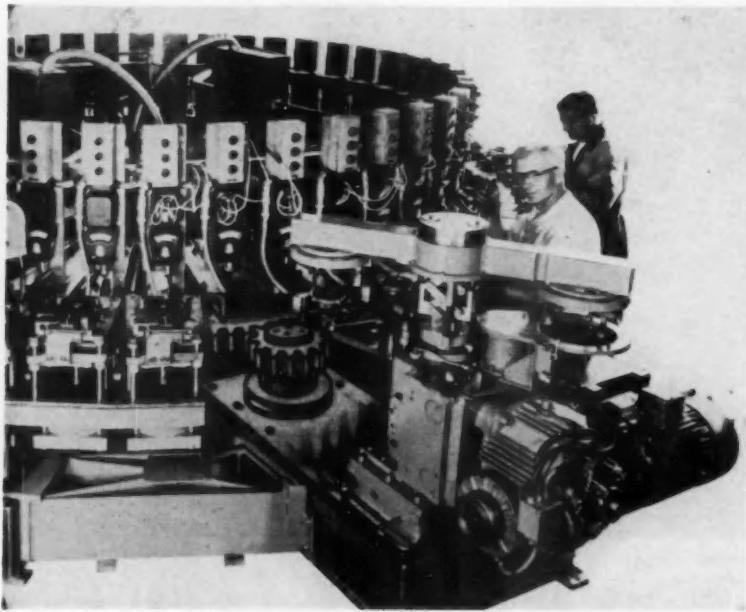
ground ways are standard equipment. Automatic lubrication of ways is available. The unit can be mounted in horizontal, angular or vertical positions.

Circle 170 on postcard for more data

*The Hartford way type hydraulic feed unit features thrust above the ways near the tool load*



## Material Handling SECTION



### HAUTAU ENGINEERING CO.

**LOADER FOR DIAL TABLE**—By providing a geared power take-off on a standard swinging arm machine loader, a single unit can load, unload and index a dial table. The combined unit was first developed to unload and rotate a table that is 16 ft in diameter and weighs over 15 tons. The mechanism indexes the 42 station table in two seconds and at the same time unloads a finished part from the table to an outgoing conveyor.

The unloading action is performed by two horizontal arms that are carried on a vertical shaft. Spring closed work clamps mounted on the end of each arm are so arranged as to slip over and grip a workpiece when brought down on it at the unload station. Then the arms lift and rotate through 180 deg, bringing the workpiece to a position over the outgoing conveyor where the arms lower and the clamp presses against a fixture that releases the workpiece into the conveyor. While one arm is releasing its workpiece the other arm is picking up another workpiece. The dial table is indexed by the same motion that rotates the arms.

The mechanism may be equipped with various gear ratios to provide any number of indexes per revolution, and the clamps may be designed to handle a wide variety of workpieces. By providing two spaced clamps on each arm the mechanism can be

adapted to both load and unload the table.

The basic mechanism of the loader-index is the maker's standard cam actuated box. It is powered by an electric motor that drives through an electric clutch, an electric brake and a geared speed reducer. The clutch and brake are provided so that the unit may be started and stopped at any point in an automatic cycle upon receiving a signal from the other machines.

The shapes of the cams are derived from cycloidal functions so that the table is indexed and the parts are unloaded in a minimum of time with negligible jerk. The cams drive a pair of slides that move over hardened and ground shafts on preloaded ball bushings. One slide actuates the vertical motion of the arms and the other rotates the arms and the index table.

This model of the Hautau loader floor mounts on a heavy steel base that requires a floor space of 2½ by 3 ft. Other loader models are available in a wide range of sizes and features.

*Circle 171 on postcard for more data*

### AUTOMATIC TRANSPORTATION CO.

**INDUSTRIAL TRUCK**—A die-handling truck can load and unload dies from either side or from the end of its platform. The unit's side-loading mechanism is of the motorized pin

type. Dies are loaded and unloaded off the end of the truck's platform by means of two powered winches. Winch units can be operated individually or simultaneously from push-button control stations mounted on each side of the truck and at the operator's position, permitting exact placement of dies in the presses.

Two retractable extension arms are located on each side of the platform, to bridge the space between the truck and press during sideloading operations. Drums and sheaves used to load and handle dies are also retractable, giving the unit a total width of 50 in. Lifting range of the unit is 65 in.

*Circle 172 on postcard for more data*

**LIFT TRUCK**—Gas-electric Dynamotive fork lift truck features an LP gas engine, allowing it to operate on either propane or butane gas, available in capacities of 4000 to 10,000 lb. Engine life in many instances has been doubled, it is said.

*Circle 173 on postcard for more data*

### CLEVELAND TRAMRAIL DIV., CLEVELAND CRANE & ENGINEERING CO.

**ROLL GRAB** — Hydraulic roll grab picks up rolls of material, board stock, etc., and piles them 40 or more



feet high in closely-spaced stacks. It will handle rolls in either vertical or horizontal position and turn them from one position to the other. This grab will accommodate rolls of 24 to 60-in. diam and from 36 to 84-in. long.

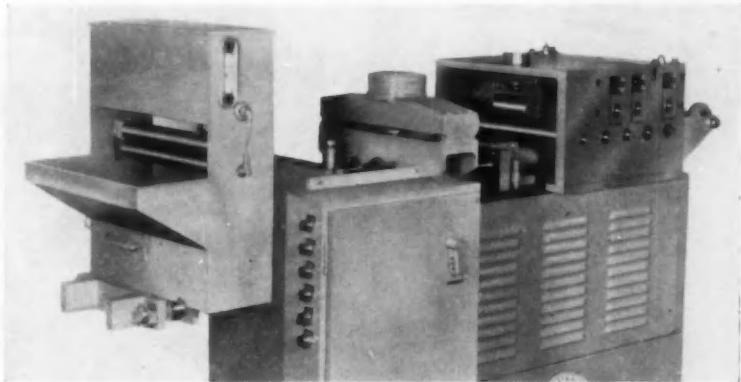
*Circle 174 on postcard for more data*

#### SESCO, INC.

**MOVABLE PRESS FEED**—Self-contained, a hydraulic gripper feed unit can be moved easily between presses. It can feed into the press from right, left, front or back. Width handled can be up to 20 in. or up to 48 in. Accuracy of feed is said to be within 0.003 in. of the selected setting. The unit is timed by the press ram stroke.

A hydraulic tank assembly serves as the base of the press feed unit and is a reservoir on which the other assemblies are mounted. It comes equipped with a front stock guide and a rear stock guide assembly, a gripper assembly, a stock retainer assembly, a motor and pump assembly, four adjustable floor legs, and a control panel.

The front stock guide keeps the stock at the proper level, and in line for the desired positioning in the press die. The stock guide rolls are adjustable, and designed to make it



easy to adjust for various stock widths. The rear stock guide assembly provides a solid guide and is adjustable.

The gripper assembly is attached to the end of the piston rod and travels on hardened and ground bars. The gripping mechanism consists of a double-action hydraulic cylinder, se-

quenced with the feed stroke, to permit accurate feeding. This unit provides a pinch grip pressure of up to 6000 lb. The stock retainer assembly is of the opposed roller-type construction and is designed to prevent the stock from slipping backward on the return stroke of the gripper.

**Circle 175 on postcard for more data**

#### ALLIS-CHALMERS MANUFACTURING CO.

**SAFETY TRUCK**—Model FTDX 40-24 Diesel fork lift truck is applicable for operation in explosive and dangerous areas. It is equipped with static-conductive tires, non-sparking metal forks, water-cooled exhaust manifold and water muffler. Engine



starting is by means of a hydraulic motor. No electrical units are used. Torque converter transmission is available. Capacities of the series range from 3000 to 10,000 lb.

**Circle 176 on postcard for more data**

#### GLEASON WORKS

**PRESS UNLOADER**—An automatic unloader for the No. 16 quenching press attaches to the left front corner of the press. It is controlled by built-in switches and valves. As the press

carriage advances to unloading position, the unloader arm rotates into position over the quenched part. The unloader head lowers, and adjustable jaws close on the quenched part. Holding the quenched part, the unloader head raises and rotates through 180 deg. The jaws open, releasing the quenched part into a tote basket or a conveyor.

The No. 16 quenching press accommodates round, flat, or irregularly-shaped parts up to 15 in. in the largest dimension. The press provides quenching under close automatic control at all stages of the quenching cycle. Parts are held between accurate dies during the quenching cycle.

**Circle 177 on postcard for more data**

#### SYNTRON CO.

**PARTS FEEDER**—Model EB-3-B vibratory parts feeder is equipped with a 36-in. diam bowl. It will orient and feed parts up to eight-in. long in either a clockwise or counter-clockwise direction.

The unit can be equipped with single or dual discharge to gravity feed tracks for automatically feeding parts to processing, packaging and assembly line equipment. The parts feed rate can be regulated by adjusting a rheostat in the separate controller. Parts discharge from the gravity feed tracks is handled by solenoid

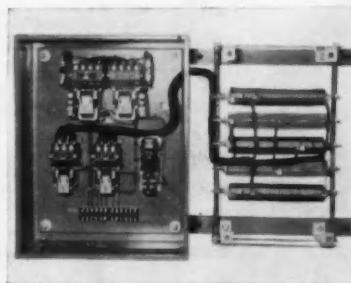
and air-operated escapement mechanisms.

**Circle 178 on postcard for more data**

#### GENERAL ELECTRIC CO.

**CONTROL PANEL**—An a-c crane control panel for NEMA Class II service applications is designed for use with mechanical load braking systems. Among stated features of the panel are easy-access wiring, all front-connected devices, and removable doors. The Class II model is available in widths of 20, 30 or 40-in. and in combinations of these widths depending upon the number of motions required in specific applications. The standard depth is 8-in., and the height is set at 15 or 25-in. depending upon the number of devices needed to meet application requirements. This wide range of sizes is said to provide maximum design flexibility.

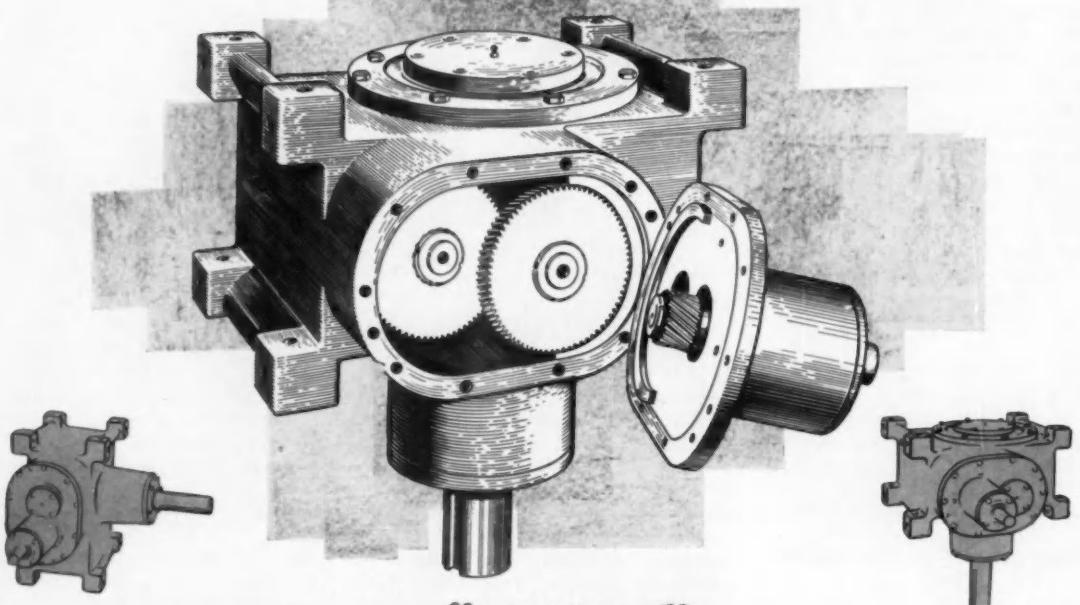
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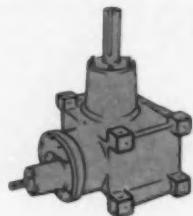
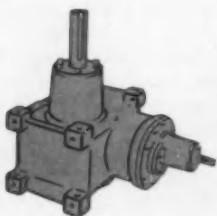
*Now* - a truly Flexible Mounting

UNIVERSAL CHANGE-SPEED

## Conveyor Drive



you can mount the "HVUT"  
in any of these positions



The Phillie Gear "HVUT" Speed Reducer was developed from many years' experience, especially for application to Conveyor Drives. It embodies all features for Flexible Mounting, plus wide range of output speeds, and the rugged durability so necessary for conveyor installations—yet all at a low initial cost.

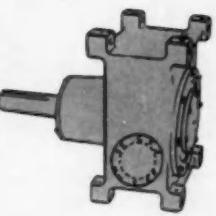
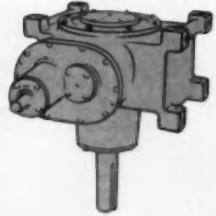
Particularly important to Conveyor Users, is the ease of changing the output speed—within a matter of minutes, the helical gear chamber may be opened and gearing replaced to alter the output speed. This versatile Reducer can be applied to most any type of Conveyor: floor, trolley, and pit—and it is also being used for other applications in industry, where unusual versatility is required.

The "HVUT" Unit may be mounted in any of the positions shown above, and when the shaft is mounted in a vertical down position, it is ideal for the overhead conveyors, which are so widely used in the automotive industry; also, the dust-proof housing makes it very desirable for pit type conveyors. When the output shaft is mounted in a vertical up position, the "HVUT" Reducer is excellent for Tow line Conveyors.

The Philadelphia Limitorque feature can also be furnished with these conveyor drives. The Limitorque device instantly breaks the motor circuit in the event of a conveyor jam or severe overload.

Gearing, bearings, and housing of the "HVUT" Unit is manufactured in strict accordance with AGMA Standards... Standard reduction ratios from 50:1 to 1800:1 in six unit sizes can normally be delivered promptly from stock.

Send for Booklet describing and illustrating unusually versatile Reducers.



**phillie gear®**

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ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.

Offices in all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID AGITATORS • FLEXIBLE COUPLINGS  
Virginia Gear & Machine Corp. • Lynchburg, Va.

# *Quality Control Section*

BALANCERS

GAGES

GEAR CHECKERS

HARDNESS TESTERS

MAGNETIC INSPECTION

SURFACE FINISH

X-RAY UNITS

AUTOMOTIVE INDUSTRIES

1956 MACHINE TOOL &  
PRODUCTION EQUIPMENT ISSUE

AI

**AI**

# Quality Control

## SECTION

FOR ADDITIONAL INFORMATION  
please use reply card on PAGE 163

### MICHIGAN TOOL CO.

**GEAR CLASSIFIER**—An automatic, probe-type, gear size monitoring system has been added to the 3-Way gear classifier line. It has a gear gaging action based on point contact of individual probes, while other models use master gears. The new unit is said to be particularly suitable where gears go directly to the classifier before passing through a washer. The probe-type model is readily adaptable to the Gear-O-Mation system for automation of the gear production line.

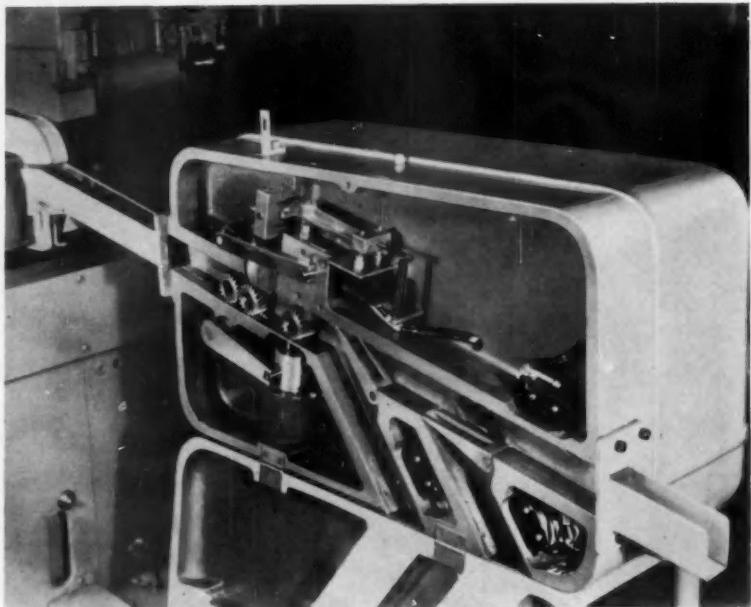
Oversize, undersize, and correct-size gears produced on hobs, shapers, shavers, or shear-speed machines are monitored automatically, using the pitch diameter as a reference base. This model has a three-point contact system, two lower stationary probes and one upper floating probe, that senses full production from a single machine or a bank of gear producing machines. Both a visual and electrical check of production accuracy is provided within the specified tolerances of the gear pitch diameter.

In operation, gears enter the classifier from the side and continue down the inclined ramp through the probe-sizing operation. Gears within specified tolerances continue through the classifier to the next operation. Any oversize or undersize gears are automatically shunted aside and collected separately for salvage or scrap.

Circle 180 on postcard for more data

### NATIONAL BROACH & MACHINE CO.

**GEAR CHECKER** — Red Ring Model SIC-24 1 in. gear checker inspects spur gears up to 25½ in. OD, as well as splines, for accuracy of tooth size, spacing, eccentricity and parallelism. Spur gears and splined parts up to 11½ in. between centers can be accommodated on the new checker.



A feature of the machine is the unique type of slot design in the table surface which positions the various checking units in precision straight line and right angle locations. Gears to be checked are mounted between centers on head and tailstock units that are slidably mounted through a

slot in the top of a ribbed surface plate. Interchangeable heads are provided for checking eccentricity and size combination, and tooth-to-tooth spacing.

Parallelism accuracy of each side of a spur gear or spline tooth is checked by a double indicator head unit mounted in an LCA ball bearing slide unit in front of the part being checked. The base of the slide unit is locked in a slot in the surface plate which is at right angle location to the slot into which the head and tailstocks are locked. This slide unit has a 9-in. travel and moves the indicator finger across the tooth face with a handwheel control. Eccentricity and size are checked by an ECA indicator unit at the rear of the part being checked. The base of the ECA unit locks into a continuation of the same slot as the LCA slide unit.



Circle 181 on postcard for more data

#### SHEFFIELD CORP.

HARDNESS TESTER—A combination micro-hardness tester and metallurgical microscope, of non-destructive type, has a load-weight range of from 25 to 1000 grams, and requires only one minute for a complete test cycle. Interchangeable vise accessories permit the instrument to be used for testing small precision ground or lapped parts, small diameter wires, very thin materials or material coatings, thin sheet stock, cutting tool edges and ball bearings.

Vertical capacity is 2% in., and the maximum spread of standard vise jaws is 1 11/16 in. Surface finishes of 40 rms or less can be inspected, and indentations of 0.0004 in. or smaller can be measured to within an accuracy of 0.00008 in. The spot to be indented can be located to within an accuracy of 0.0002 in.

When the instrument is used as a metallurgical microscope, the interchangeable objective lenses provide



magnifications of 200x and 400x. A camera can be attached to the eyepiece for making photomicrographs.

Circle 182 on postcard for more data

#### MAGNAFLUX CORP.

INSPECTION KIT — Magnaflux YM-5 Yoke Kit, a magnetic particle device that requires no electrical power, is said to reliably find cracks in magnetic parts or members. Since electric arcing is impossible, the device makes practical the inspection of critical parts or welds in hazardous areas. It eliminates the need for disassembly, heavy equipment, and electric power, and increases the efficiency of regular inspections.

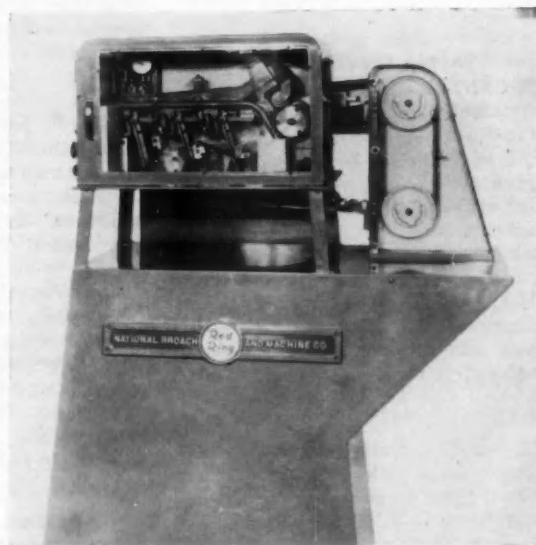
The kit comes complete with a metal storage and carrying case and total kit weight is only 22 lb. The yoke legs are hinged and the angle-cut tips rotate so that good magnetic contact can be made on almost any shape part. The permanent magnet elements are Alnico, and the company has developed a new magnetic circuit which gives the unit an effective magnetizing power for its weight.

Circle 183 on postcard for more data

#### NATIONAL BROACH & MACHINE CO.

GEAR GAGER—Model GRD gear gaging and sorting machine checks and sorts small automotive pinions automatically for tooth-size accuracy. It checks parts to tenths of a thousandth accuracy, sorts them according to undersize, oversize, or "OK" specifications, and shuts down a gear production machine if more than a given number of rejects of a specific type are successively produced.

Circle 183 on postcard for more data



#### BRUSH ELECTRONICS CO.

SOUND ANALYZER—Model BL-2109 third octave spectrum analyzer, through the use of a narrow frequency band analysis, provides physical measurement data that is said to be easily correlated to subjective tests for loudness of sound or the intensity of vibration. The analyzer works in the range of frequencies from 35 to

18,000 C. Through the use of 27 fixed one-third octave band filters with the associated low noise-high gain amplifiers the instrument affords either manual or automatic switching. Data can be read from a meter or graphically recorded through a connection to a level recorder.

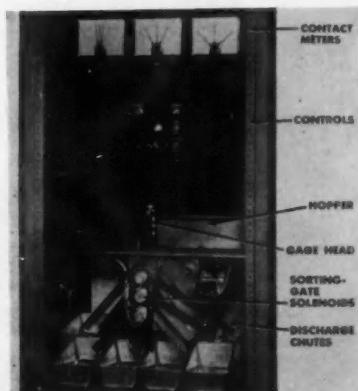
Circle 184 on postcard for more data

#### CLEVELAND INSTRUMENT CO.

SIZER—Autosort Model 101 automatically gages a variety of parts into as many as five specific size categories plus oversize and undersize, at speed of more than 3000 parts per hour.

The unit handles parts up to three in. long and 3/8 in. OD, and can be arranged for checking length, thickness, OD, or any other external measurement. It can be furnished with any size range desired from 0.0002 to 0.010 in., and for sorting by increments as small as 0.000050 in.

The parts to be measured are fed



## Quality Control SECTION

from a hopper by motor-driven fingers and are placed, one at a time, on an anvil beneath a Par-Ac gage head. A voltage produced by the gage head goes through an amplifier to three contact meters; and the meter hands are thus positioned according to the size of the part being measured. The meter hands make contact with the preset contact arms to actuate a relay system; and this energizes a sorting-gate solenoid that corresponds to the size group of the part. The part is then pushed off the anvil by the feeding-in of the next part, and drops vertically until it is deflected by the gate into a corresponding discharge chute.

*Circle 186 on postcard for more data*

### PRATT & WHITNEY CO., INC.

**GAGE**—The direct setting electro-limit external gage is described as ideal for gaging parts of similar sizes, for gaging several dimensions on a single part, for use as a comparator on short runs involving a few to a few hundred parts, and for a variety of other precision inspection and gaging jobs. Said to be capable of quick, easy setting direct to 0.0001 in. without the use of masters, this gage also gives comparative readings, over or under the dimension set, direct to 0.00005 in. on a full scale of  $\pm 0.001$  in. Total range of the gage is six in.; repeatability is within 0.00005 in.

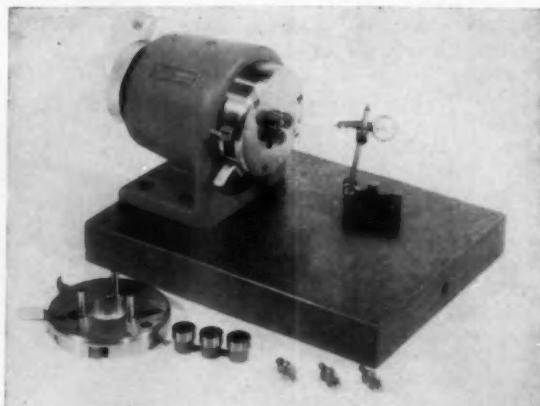
Standard gage blocks are used to set the gage for even inches. Fractional inch settings are obtained by



**GAGING FIXTURE**—Positive means of checking shoulder squareness relative to centerline of product threads is provided by this gaging fixture. Used in conjunction with ordinary dial indicator, fixture consists basically of gaging head mounted on precision aligned spindle. Unit provides an inspection range of from  $\frac{1}{4}$  to  $1\frac{1}{2}$  in. thread diam.

*Circle 187 on postcard for more data*

### PRATT & WHITNEY CO., INC.



operating a handwheel that elevates the gage head through a precision micrometer screw. The desired setting is read direct to 0.0001 in. on the setting counter. Re-setting within the established inch range is accomplished by turning the handwheel as required.

*Circle 188 on postcard for more data*

### GENERAL ELECTRIC CO.

**THICKNESS GAGE**—A hand-held, permanent-magnet thickness gage, which operates on a magnetic principle and requires no power, is designed for non-destructive measurement of the thickness of non-magnetic materials bonded to smooth iron or steel. The gage will also measure the thickness of non-magnetic materials which can be placed over a magnetic reference plate. Typical materials which can be measured are paint coatings, platings, enamels and sheet materials such as plastics, paper and mica.

The small, portable gage consists of a double range scale (high scale from 0.001 to 0.060-in. and low scale from 0.000 to 0.007-in.), range changing slider, calibration adjuster, adjustable limit pointers, and reference thickness standards. A "go-no-go" feature is built in to help the user maintain quality control on surface coating thicknesses. After the instrument is calibrated and adjusted for the specific range limits, the user need only note if the null pointer stays between the red upper limit and red lower limit pointers to maintain the desired quality.

The instrument uses an internal

alnico magnet which provides flux to the contact feet. A variable air gap in the magnetic circuit, introduced by the variable thickness of the film on the backing material, causes flux changes in the circuit. The thicker the film the more flux will leak between two iron legs located between the magnet and the contact feet. A gaussmeter-type movement measures this internal leakage flux.

*Circle 189 on postcard for more data*

### W. C. DILLON CO.

**THERMOMETER**—Deviations in temperature from the normal reading are easily seen from a distance on the Signal Eye-equipped bi-metallic thermometer. A bright red disk is attached to the pointer, while a white disk is attached to the dial glass at the normal temperature. As the pointer moves away from normal, the red spot becomes progressively more visible, warning the operator who may be too far away to see the pointer itself.

*Circle 190 on postcard for more data*

### GREENLEAF MFG. CO.

**STRAIN GAGE**—This system is designed to register very minute deflections, due to stress or strain, in structural parts or assemblies of an aircraft on a continuous monitoring basis. Visual and/or recorded data is possible for registration.

The system consists of a potentiometer, servo motor, gear train, indicator, comparator, amplifier, and a transmitting synchro. Inputs of 10 to 50 millivolts display full scale readings on the dial of the indicator.

Inherent electrical noise in the system is below 20 microvolts.

The equipment is designed for the use of two comparators of different types. One adaptation is the position of a potentiometer as a per cent of full potentiometer range. In addition, the system registers the output of a 350-ohm strain gage bridge as a per cent of full scale force input. Provisions are incorporated to permit zero adjustment of the system.

Deviation of the system from a straight line does not exceed 0.2 per cent full scale. Minimum readable increment of motion is within 0.2 per cent of full scale, which is defined as the resolution of the system. The overall accuracy of the system is less than one per cent under all conditions, and repeatability is within 0.2 per cent of full scale. The equipment has been designed to meet military specifications for airborne equipment.

Circle 191 on postcard for more data

#### EAM DIV., INDUSTRIAL GAUGES CORP.

**MICROMETER**—Electronic micrometer is capable of checking up to 3500 pieces per hour at tolerances less than 0.0001-in. Called the 'Minitron,' it features two sets of adjustable anvils for accepting a production run for checking without "feel." This permits the gage stand to be pre-set and locked to conform to a master. The pieces are inserted and the position of the indicator noted. Diameter, concentricity, and taper are quickly found.

The instrument has an electronic adjustment which permits the establishment of any magnification desired from 10,000/1 to 1000/1. When adjusted for largest magnification, 0.0001-in. appears over one full inch. There is said to be no flicker, flutter, or drift of the gauging indicator.

Circle 192 on postcard for more data

#### INDUSTRIAL ENGINEERING CORP.

**TEST STAND**—A completely packaged test stand for the aircraft industry is designed to provide the following types of power: variable voltage dc from five to 32 v with 200 amp maximum; variable voltage 60-c from 0 to 135 v with 20 amp maximum; variable voltage from 95 to 135 v with variable frequency from 380 to 420 c. Optional caster mounting provides mobility.

Circle 193 on postcard for more data

#### FEDERAL PRODUCTS CORP.

**WHEEL CHECKER**—Model 144 B-59 electronic gage, conveyorized automatic machine checks upper and lower bead seats of automotive wheels for radial and lateral runout. Good wheels within 0.045 in. TIR radial and 0.063 in. TIR lateral runout tolerances pass on to the valve hole punching operation, while rejects are dropped out. Two gages take alternate wheels for a total of 900 per hour. Wheel handling is by hydraulic plungers and pistons. The fixtures clamp by bolt holes at 1000 lb per hole and rotate the wheel. Contacts move in automatically and send impulses to a four-station classifier.

Circle 194 on postcard for more data

**PISTON GAGE**—Model 144 B-83 is an electronic gage which measures taper and outside diameter on automobile pistons, then stamps a code letter on the piston to identify the diameter.

It takes both measurements, i.e., taper between the top and the bottom of the piston skirt and the OD at the upper end of the skirt. However, if the taper measurement is not within tolerance limits, the gage's electronic classifier will ignore the diameter measurement and the part is rejected. If the taper is satisfactory, there are six good diameter classifications differing by 0.0003 in., plus oversize and undersize. Signal lights for each diameter classification enable the operator to see which category a particular piston falls into, and an ink impregnated stamper unit stamps the code letter indicating the diameter on the piston itself.

This model is a semi-automatic gage, in which the gaging and stamping action is entirely automatic, but the parts hand-fed and hand-disposed. Gages with fully automatic feeding and sorting units are available. With this model, the operator places a piston on a precision-ground locating plug which assures centralization of the part in the gage. After the part is located, a switch is tripped which starts a vibrator that settles the part firmly between the gaging contacts. Both the taper and diameter measurements are made simultaneously and the electronic classifier receives the size signals from the gage heads. The classifier lights the proper signal light and activates the stamper unit. When the piston is released by the stamper, the operator places it in the disposal box as indicated by the signal light. The gaging cycle takes approximately 4½ sec.

Circle 195 on postcard for more data

#### BALDWIN-LIMA-HAMILTON CORP.

**STRAIN GAGE**—SR-4 resistance type strain gages for use at temperatures up to 1800 F are of the etched foil type. Strain gages of this type are licensed and manufactured under Technograph patents, and are offered for experimental use without guarantees. They are available in kits including ten gages, four types of cement with different temperature limits, detailed instructions for use, and tools to simplify application.

Gages consist of an etched foil grid 0.0005 in. thick on a temporary carrier which is stripped off when applying them, leaving the grid embedded in a ceramic cement. Ni-

#### PERFORMANCE MEASUREMENTS CO.

**TEST BENCH**—This new type of bench for testing and quality control makes it possible to arrange each instrument on the unit in any combination to facilitate a vast variety of required testing or measurements. Instruments are available for the measurement of speed in rpm or cps; time intervals as small as 10 microsec; air pressure, voltage current, resistance; voltage breakdown of insulating materials, etc. The bench is wired to provide special power requirements in both ac and dc.

Circle 196 on postcard for more data



## Quality Control SECTION

chrome, Nichrome V, and Constantan grids are available in gage lengths of 1,  $\frac{1}{2}$ , and  $\frac{3}{8}$  in. Temperature limits of the four cements are 700, 900, 1100, and 1800 F. Tests indicate that the gages can be used in static tests up to approximately 1100 F. Above this temperature the gages can be used only for dynamic tests. Nominal resistance of the gages is between 97 and 120 ohms.

*Circle 197 on postcard for more data*

**STRAIN GAGE**—Standard SR-4 bonded resistance wire strain gages have flat grid, fine pitch, and Bakelite base. Type ABF-7, with  $\frac{1}{4}$ -in. grid length, may be used in place of wrap-around type gages of short grid length. Type EBDF-TT+ is a self-compensated gage of  $\frac{1}{4}$  in. grid length for use on titanium (TRC-70 or TRC-130 or equal). Temperature range is 50 to 250F. Type EBDF-13Q+ is a self-compensated gage of  $\frac{3}{8}$ -in. grid length for minimum response to temperatures between 50 and 250F when cemented to quartz. Bonded to unrestrained members of other material it would measure thermal expansion stress when temperature-cycled. Alternate 13T+ type gages for titanium and 13Q—and 7Q—for quartz are also available.

*Circle 198 on postcard for more data*

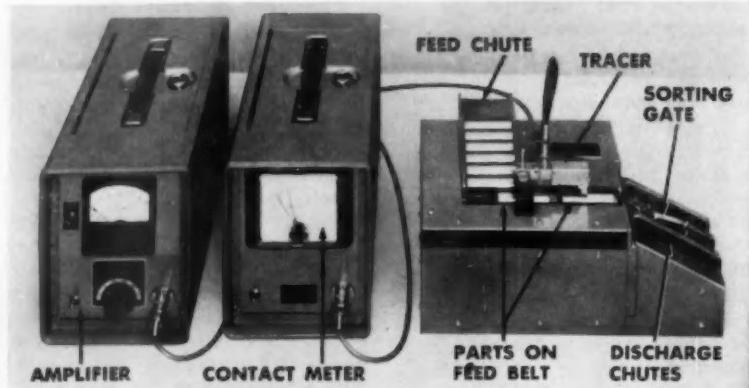
### SUMMIT-ROBERTS PRODUCTS, INC.

**MEASURING UNIT**—Contour-O-Scope checks the dimensional radial accuracy of parts such as impellers, expellers, inducers, exducers, defusers,



nozzles, turbine wheels, blades, two and three-dimensional cams, and other parts having contoured surfaces. Stated features include high accuracy, simplicity of operation, and provision for direct readings.

*Circle 199 on postcard for more data*



### MICROMETRICAL MANUFACTURING CO.

**SURFACE ROUGHNESS**—Inspection unit sorts parts in accordance with the microinch roughness measured along an OD or flat surface, including tapers and parts with grooves or shoulders.

The workpieces go from a feed chute onto a conveyor belt which moves them beneath a Profilometer tracer. As the parts leave the tracer, they are automatically directed into an "accept" or "reject" discharge chute in accordance with their roughness. With the equipment shown, contact meter is set to the high roughness limit, and parts that are rough or rougher are rejected, while all other parts are accepted. Equipment can be furnished to accept work within a selected range of roughness, rejecting parts that are either too rough or too smooth. In addition to the measuring-and-sorting equipment, the company can supply auxiliary items, including equipment for automatic selection of parts to be measured (such as every fifth or tenth part from the production line), signal lights, and controls to shut down the line after a given number of parts are rejected.

*Circle 200 on postcard for more data*

### MICROMETRICAL DEVELOPMENT CORP.

**RECORDER**—A mechanical-electronic instrument, called Proficorder, provides a magnified chart record of the profile of internal and external machined and finished surfaces. It records waviness, bows, steps and other widely-spaced irregularities, with surface roughness omitted. It also shows roughness irregularities alone, with waviness omitted, or the

combined roughness and waviness profile. Selection is made by push buttons on the control panel. The charts show the true height and spacing of the surface irregularities, and open up new possibilities in production setup and inspection, quality control, and research and development work. In addition, a meter on the control panel shows the average height of the roughness profile being recorded.

The device includes a Tracer, a Pilotor, and an Amplicorder, all mounted on or in a desk-type console. The piece being profiled is placed on the Pilotor base plate and the piloting mechanism moves the Tracer in a plane parallel to the work surface at 0.005 in. per second, over any desired length of trace from 1/16 to 1 $\frac{1}{2}$  in.

The Tracer is a differential-transformer-type transducer. It has a stylus with a diamond tip of 0.0005 or 0.0001 in. radius which moves along the surface. Pen movement is proportional to the vertical displacement of the Tracer tip. Six vertical magnifications are provided from 0.000025 to 0.0005 in. per chart paper division (approximately 10,000x to 500x), and are selected by push buttons on the control panel.

A gear shift lever on the recorder chart drive provides seven horizontal magnifications, from 0.001 to 0.100 in. per chart paper division—approximately 500x to 5x.

*Circle 201 on postcard for more data*

### MAICO CO.

**FEED RATE METER**—Provides accurate readings of the speed of travel of cutting tools, carriages, and heads in low-speed turning, boring and grinding operations. It consists of two parts, the pickup unit and the indicating unit. The pickup unit is easily

mounted horizontally or vertically, so that movements of the machine push a  $\frac{1}{8}$ -in. drill rod through bearings in the unit. The speed of travel of the rod, which turns a calibrated magnetic drum, is transmitted to the portable indicating unit via vinyl-covered cable. The speed rate is then read directly from the large calibrated dial. Speeds are indicated from a fraction of an inch per minute up to 5, 10 and 20 ipm.

A remote indicator, or one indicator with any number of pickups, can be used. Overspeed or rapid acceleration will not damage either the pickup or the indicator unit.

*Circle 202 on postcard for more data*

#### FRANKLIN ELECTRONICS, INC.

**STRAIN CYCLE COUNTER**—Model 138E counter can total strain cycles occurring within six different levels. This recording apparatus incorporates a self-balancing strain gage bridge, servo amplifier and counters to register strain cycles as low as 500 psi. Mechanical loading and fatigue data occurring in automotive equipment, aircraft, and other structures can be collected under actual operating conditions. A high reliability factor is achieved through use of a transistor amplifier.

*Circle 203 on postcard for more data*

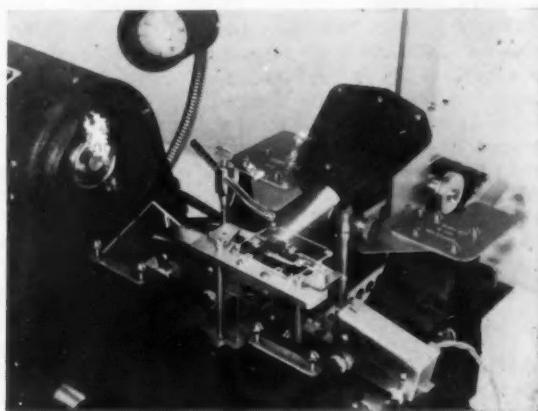
#### GREER HYDRAULICS, INC.

**HARNESS TESTER**—A universal tester is designed to provide an accurate check of continuity, insulation resistance interlead shorts and shorts to ground in the electrical control harness of turbojet engines. The device consists of a low and a high voltage test circuit, switches and controls for

**BALANCER**—A modified Balancer is used for balancing miniature rotors and small rotating assemblies. Light-weight vibrating head assembly is sensitive to very small moments of unbalance, and allows balancing to be done at high speeds (10,000 to 15,000 rpm) when desirable.

*Circle 204 on postcard for more data*

#### R. B. ANNIS CO.



applying these potentials to the cable being tested and lights which indicate proper or faulty operation. Controls and indicating lights are mounted on an insulated instrument panel, and a plug panel is provided on the back of the console for connecting the harness. Large casters permit easy movement.

*Circle 205 on postcard for more data*

#### LINCOLN PARK INDUSTRIES, INC.

**DIAL SNAP GAGES**—A line of dial snap gages is designed to give a direct reading from the measuring anvil to the indicator. There are no bearings, levers, shafts or cams. Parallel anvils are tipped with solid cemented-carbide to provide long service life. Precision adjustments of the upper anvil by means of a fine pitch ground thread attachment can be made within a  $\frac{1}{4}$  in. range. The entire construction is completely shockproof. The indicators are encased in a housing to protect

them from damage. Ten standard models are supplied in sizes up to 2.500 in. Larger models and special types are manufactured to customers' specifications.

*Circle 206 on postcard for more data*

#### WEBBER MANUFACTURING CO.

**TEST CHAMBER**—Is designed and built to simulate altitudes up to 150,000 ft. It features automatic control of temperatures from -100 to +250 F. Humidity can be controlled as desired from 20 to 95 per cent.

Similar type test units are available in sizes from very small test compartments to large walk-in rooms; and can be designed to meet particular or variable conditions.

*Circle 207 on postcard for more data*

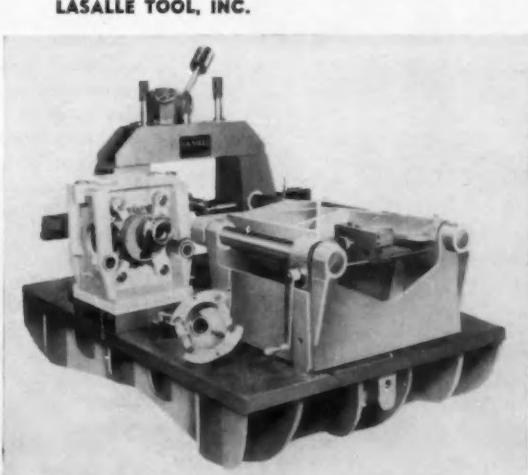
#### CONTROL INSTRUMENT CO. (BURROUGHS CO.)

**BALL BEARING CHECKER**—A unique technique for measuring torque on ball bearings is used in a so-called mass accelerator. The device is designed both for laboratory and factory use. A known inertia load is mounted on the outer race of the bearing. The inner race is rotated at a known speed. This is done in such a way that bearing friction torque is the only force which causes the outer race to move. Torque is determined, according to graph or empirical formula, by the number of inner race revolutions required to make the outer race carry out one revolution. A synchronous instant-starting motor with the necessary circuitry to effect instant stops is used. The machine can handle all instrument bearings from 0.1875 to 1.500 in. outside diameter.

*Circle 208 on postcard for more data*

**ALIGNMENT GAGE**—Designed to check production differential carriers against a master part, the gage duplicates location and clamping of workpiece in either a progress-through or transfer-type machine. Using the master fixture with a production carrier will show any misalignment in the carrier or discrepancies in location and clamping surfaces.

*Circle 209 on postcard for more data*



## Quality Control SECTION

### TINIUS OLSEN TESTING MACHINE CO.

**DISTORTION TESTER**—Five specimens may be tested at the same time by a new five gang heat distortion tester. Complete within itself, each of the five units includes an automatic deformation indicator, thermometer, pilot light, automatic heating controls and a cooling system. Temperature increases from 24°C at 2°C per minute can be obtained through use of the automatic heating controls.

Circle 210 on postcard for more data

**HARDNESS TESTER**—Mark VI Penetrascope portable metal hardness tester is used for testing ferrous as well as non-ferrous metals of a wide range of sizes, shapes and contours. A variety of clamps including chain, magnetic and C-clamps make it pos-



sible to test specimens ranging from metal strips only 0.002-in. thick to cylinders over eight ft in diameter. Accuracy is obtained in the 16 to 800/1000 D.P.H. range (from softer than O on the Rockwell B scale to 64/69 Rockwell C), with excellent comparative results obtainable up to

1500 D.P.H. (75 Rockwell C). In operation, a 136 deg pyramidal diamond—Vickers system—is pressed into the metal by an accurately controlled load of up to 40 kg. A calibrated microscope measures the indentation with an accuracy of one micron. Ball-type indenters of one mm and two mm diameter are available for testing cast iron and other grained materials.

Circle 211 on postcard for more data

### PERFORMANCE MEASUREMENTS CO.

**SPARK PROTRACTOR**—Type 2 electronic spark protractor shows on the large General Electric DB-18 meter a continuous indication of spark advance. Accuracy is reported as  $\pm \frac{1}{2}$  crankshaft degree at all speeds. A new pentode circuit is designed to give stable operation at low idle rpm. Pulses from two pickups on the engine control the conducting period of one-half of a multivibrator circuit. Ratio of the conducting to non-conducting period is calibrated in degrees spark advance on the meter. The device is available for two or four cycle, six or eight-cylinder engines as standard, and one, four or 12 cylinder optional.

Circle 212 on postcard for more data

### J. W. DICE CO.

**POWERED MICROMETER**—Model H motor-driven electronically-controlled precision micrometer is said to obtain direct measurements accurate to 0.00005-in. or better, independent of any human variable in sensing contact or setting the dial. A screw-thread measuring instrument, it shows actual dimensions of any electrically conductive part directly on a three in. dial with widely spaced dial divisions for each 0.0001 in. After placing work

on anvil, the operator presses a small button. A built-in motor brings the micrometer to the precise point of contact with work at a high rate of speed. At the instant a setting is completed a green light glows under the index window.

The electronic circuit controlling



the motor drive senses instant of physical contact between micrometer tip and work within 0.00005 in. When the button is released the motor automatically backs micrometer away from work about 0.001 in. A repeat reading can be obtained instantly by again pressing the button.

Circle 213 on postcard for more data

### HOLGER ANDREASEN, INC.

**WING X-RAY**—Andrex portable X-ray unit is said to reduce aircraft wing stringer inspection to eight hours. Only two men are required in its use. An estimated 1000 man-hours per year may be saved by not opening and closing wings for inspection.

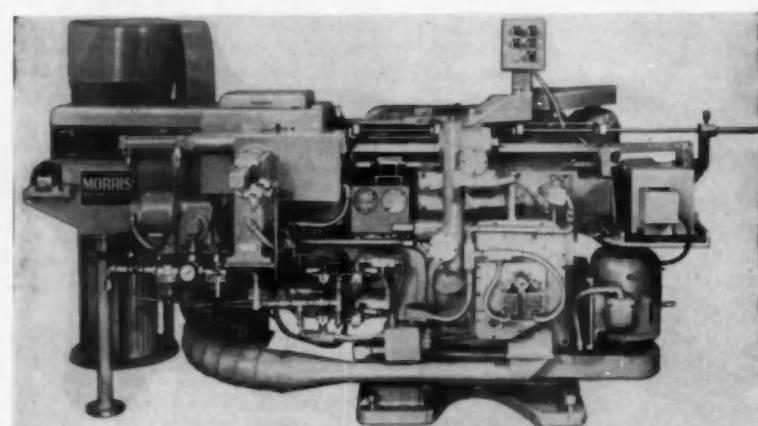
Circle 214 on postcard for more data

### MORRIS MACHINE TOOL CO.

**BALANCING MACHINE**—A piston balancing machine automatically receives, weighs, sorts, positions, clamps, machines and discharges internal combustion engine pistons at production rates to 720 pieces per hour. It maintains piston weights uniformly to tolerances of plus or minus one gram. It also tests each piston for proper machining position, refusing to accept pistons received in inverted positions.

Pistons are automatically weighed. Grossly overweight and underweight units are automatically rejected from the machine. Pistons within the gross weight limits are weighed a second time. The machine automatically determines the amount of metal to remove from the trim pads.

Circle 215 on postcard for more data



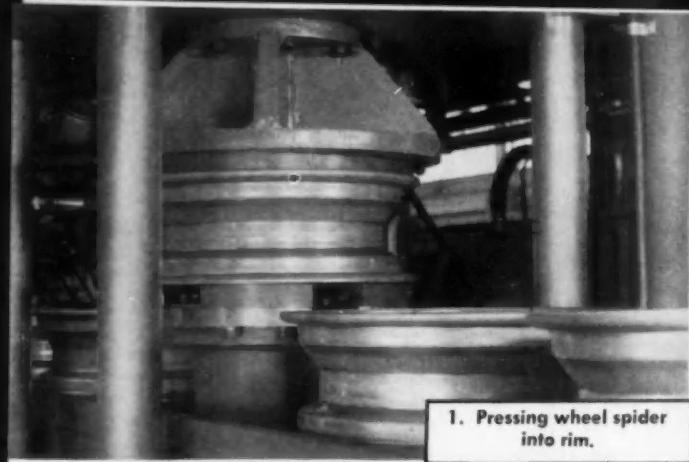
# *Welding Equipment Section*

SEAM  
PROJECTION  
SPOT  
SHIELDED ARC  
SHIELDED GAS  
CONTROLS  
TIMERS  
WIRE  
FLUX

AUTOMOTIVE INDUSTRIES

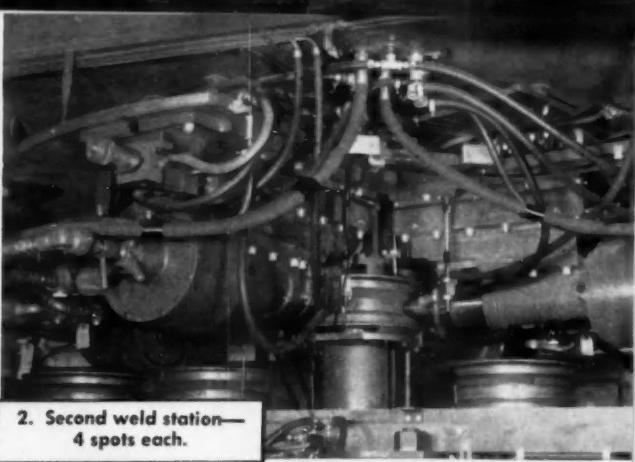
1956 MACHINE TOOL &  
PRODUCTION EQUIPMENT ISSUE

AI



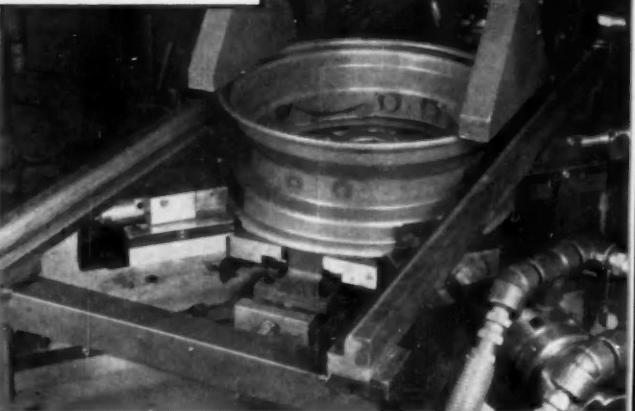
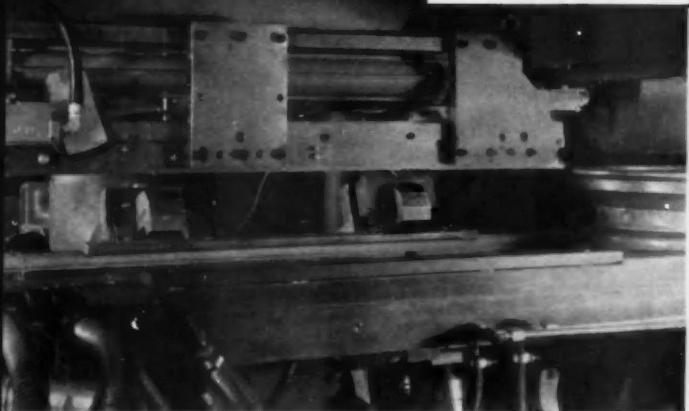
1. Pressing wheel spider  
into rim.

3. Punching and coining  
for valve stem.



2. Second weld station—  
4 spots each.

4. Dimpling wheel cover  
retainer.



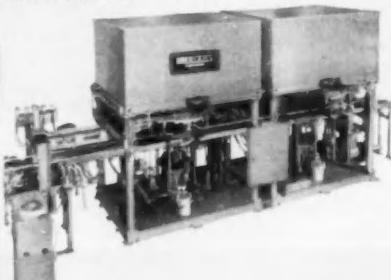
## Sciaky Resistance Welding Techniques

**readily satisfy critical primary structures  
with weld integrity and consistency in high production**

Today Motor Wheel and other leading manufacturers are fabricating critically stressed automobile wheels with eight Sciaky Three-Phase spot welds instead of the previous twelve precision rivets. The elimination of the holes for rivets or other mechanical fastenings satisfies the air-tight requirements for tubeless tires as well.

A true example of automation, fully automatic Sciaky equipment includes press assembly of parts, piercing and coining of valve hole, and dimpling wheel trim retainers. Skilled labor no longer needed is made available for other important operations.

This tremendous advance in design concept and production methods is the result of years of exhaustive testing and development. Only Sciaky patented Three-Phase balanced load welding with 85% power factor (compared to 30% for conventional unbalanced load single phase) provides the integrity and consistency necessary to critical wheel assembly.



Write today for "Resistance Welding At Work," Vol. 4—#9, completely describing this outstanding application—yet another fine example of Sciaky basic thinking . . . resistance welding techniques to do more useful work at lowest operating cost with maximum reliability.

*Largest Manufacturer  
of Resistance Welding Machines in the World*  
Sciaky Bros., Inc., 4925 W. 67th Street, Chicago 38, Illinois, POrtsmouth 7-5600

**SCIAKY**

**AI**

# *Welding Equipment*

## **SECTION**

FOR ADDITIONAL INFORMATION  
please use reply card on PAGE 163

### **AMERICAN CHAIN & CABLE CO., INC.**

**LOW-ALLOY WIRE**—A-S-8620 is a chrome-nickel-molybdenum alloy automatic welding wire with less than two per cent total alloy content which is said to be "sympathetic" towards practically all low alloys. It is of standard AISI low alloy content. If the base metal is of higher carbon, the carbon pick-up from dilution in the weld metal adds wear resistance and elongation qualities to prevent cracking and spalling.

In its application, the formulation is suited for welding U. S. Steel's "T-1 Steel," an alloy with very high physical properties—tensile strength 105/130,000 psi; elongation 15 to 20 per cent; and Rockwell C20-35. With the proper flux (submerged arc) on T-1 steel, the welding wire gives a tensile strength of 114/116,000 psi, elongation of 12 to 15 per cent; a Rockwell of C28-30; and the chemical analysis as welded is very close in all elements to the parent T-1 steel. Face and root bends show 100 per cent efficiency and there is no "affected" zone, it is further stated.

*Circle 216 on postcard for more data*

ating life. Capacitors, for example, are rated at 600 v even though circuit voltages are normally 115 v. The ignitron tubes are protected from excessive operating heat by a thermostatic switch snap mounted on the outer water jacket, which locks out welding current at a preset temperature. The inside sheet of the water jacket is constructed so that thermal contact with the thermostat is maintained. Available as auxiliary equipment, a water saver kit includes a second thermostatic switch for mounting on the second ignitron tube.

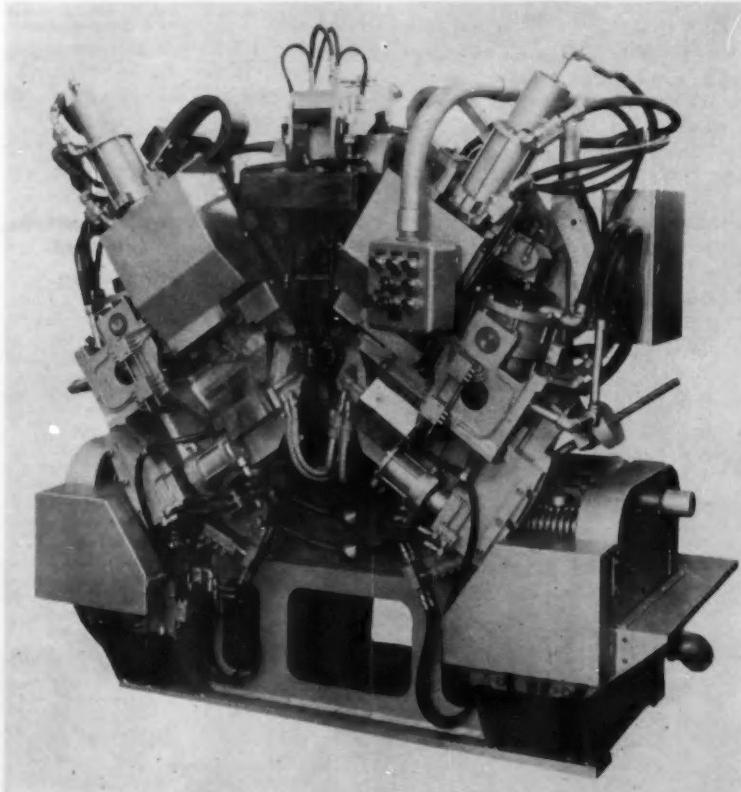
*Circle 217 on postcard for more data*

### **TAYLOR-WINFIELD CORP.**

**DOUBLE END WELDER**—Flash-butts rolled steel band stock to high strength forgings to make automatic transmission bands. It joins both ends at once, and the welds are of the same cross-section as the band, since resistance flash-butt welding produces a 100 per cent efficient joint. No special preparation of the forging is necessary for making the welded joint.

After welding, the joints are broached free of flash, the forging is severed between its bosses and machined to complete the band.

*Circle 218 on postcard for more data*



### **WESTINGHOUSE ELECTRIC CORP.**

**CONTROLS**—Resistance welding controls feature printed circuits and a weld-safe circuit for the protection of equipment and work in process. Circuit components and tubes have been reduced to the minimum to reduce panel weight by 30 per cent.

The weld timer and sequencing circuit is designed to lock out welding current should tube failure occur at any time.

All component locations and ratings are printed on the front of the panel to facilitate inspection and servicing. Components can be removed or replaced with conventional soldering methods. Heavy duty, long life components are used for maximum operation.

## Welding Equipment SECTION

### AIR REDUCTION CO., INC.

**WELDING HEAD** — Model C Heliweld automatic head provides a completely automatic weld cycle. A single switch causes the holder to move downward and start the arc, and the arc length is maintained constant

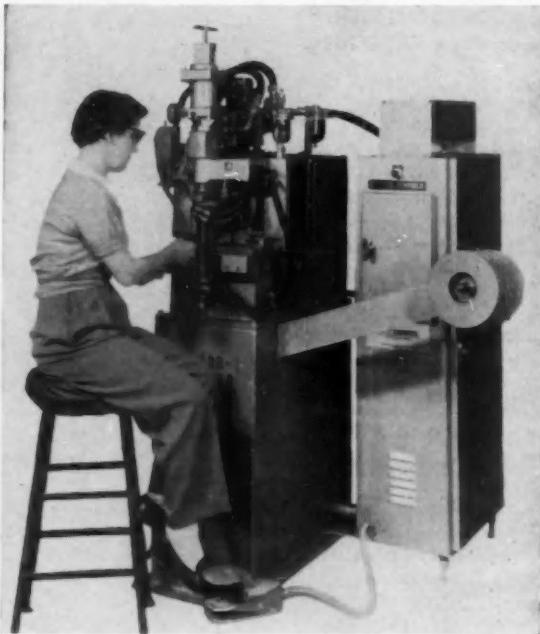
throughout the weld. Electronically controlled, this unit is primarily designed for d-c Heliwelding with argon or helium shielding gases, or a mixture of the two. It can also be used for a-c Heliwelding with the Airco Heliwelders or the Airco Heliweld

Bumblebee arcwelder (when a-c adapting equipment is added). Heliwelding is a tungsten inert-gas arc-welding process for joining light gages of stainless steel, mild steel, aluminum, brass, copper, titanium, beryllium, Everdur, nickel, Inconel and Monel.

The assembly consists of a head with a 32-in. long machine holder which accommodates electrodes from 0.040 in. to 5/32 in. diam up to 24 in. long, a main control panel, and a remote control operator's station. Water and gas controls are included in the main control panel. The arc length (distance between electrode and work), once set, is maintained by automatic up and down movement of the holder to follow irregular surfaces.

The head can be operated in the horizontal as well as in the vertical (normal) position. The holder can be tilted, by means of a micro-positioner, six degrees either side of center. Both touch starting and high-frequency-type starts (electrode does not touch work) are available.

Circle 219 on postcard for more data



### TAYLOR-WINFIELD CORP.

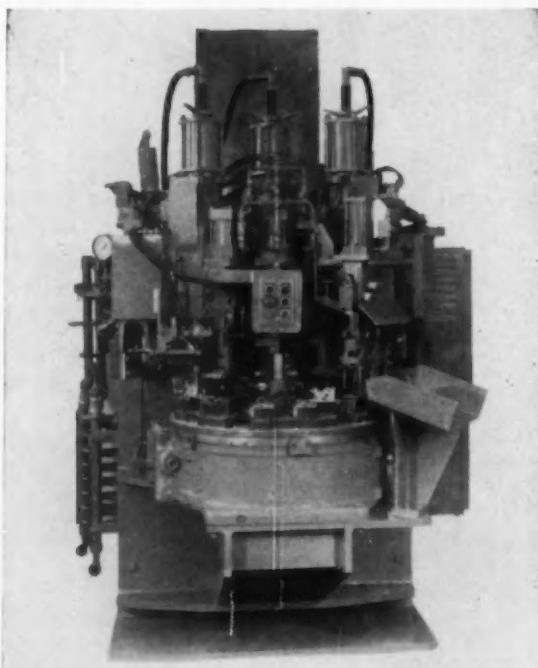
**AUTOMATIC WELDER** — Joins electrical terminals to wires. The terminals are fed in strip form, then welded and staked to the wires. The use of resistance welding insures good electrical bond. Heat time is short to permit use of plastic covered wire without damage to the cover. Feeding of terminals in strip form and addition of a cut-off shear results in high production rate. All three operations, welding, staking and cut-off are done automatically as the welder indexes the product through the several stations.

Circle 220 on postcard for more data

Circle 219 on postcard for more data

TAYLOR-WINFIELD CORP.

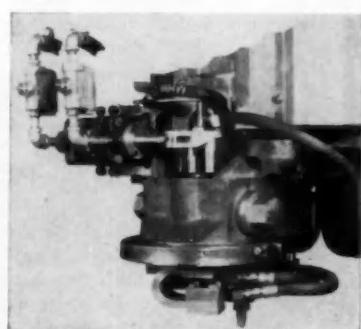
**WELDING GUIDE** — Stitch welding head is designed to guide spot welding electrodes to achieve contoured seam welds previously unobtainable. Either spaced or overlapping spots on any contour pattern may be used. The



### TAYLOR-WINFIELD CORP.

**HOT UPSETTING MACHINE** — Includes a special triple-station, dual ram resistance welder with Geneva index table. The machine assembles automobile door locks by heating and upsetting the ends of three tabs on a cover cup which penetrate openings in the base plate, providing an outboard bearing for the lock gear. Assemblies are loaded and processed by pairs. Production is said to be limited only by operator loading time requirements.

Circle 221 on postcard for more data



stitch head may be mounted on any press welder, and replaces the upper electrode. Features include: indexing head fully water-cooled for high production, operating speed up to 100 spots per minute, dependent on material being welded, full 360 deg rotation. Maximum radius of pattern is three in., minimum is 1/2 in.

Circle 222 on postcard for more data

### SCIAKY BROS., INC.

**TIMING CONTROL**—Counts cycles of line frequency and is said to meet the exacting requirements of welding materials such as high heat-resistant, heat treatable metals.

Heart of the system is the dekatron tube, a cold cathode type gas tube having a common anode and 10 cathodes with two guide pins between each pair of cathodes. When power is applied to the tube a negative voltage is applied to the cathode which is to be fired. When the counting operation is started, pulses are fed to the guide pins and the glow is transferred from one cathode to the next until the count has been completed. This count may be any amount from 1 to 10, and any operation which will furnish a pulse may be used to trigger the tube. By adding a decade dekatron the count can be increased to 100. Adding a third dekatron will increase the count to 1000, the maximum used. Only one dekatron tube is needed to control the functions of squeeze, preheat, weld, quench, post heat, hold and off times. Another dekatron tube is used for heat, cool, and current delay functions.

All of the welder functions are synchronous. The control dials for timing operations are calibrated in cycles, while the control dials for interval functions are calibrated in impulses of secondary current. The actual functions produced by the welder are said to be the same as the control settings, regardless of the number of secondary current impulses, over the entire range of adjustment. Exact duplication of weld settings for satisfactorily reproducing welds is reported to be readily

Sciaky resistance welder equipped with the new dekatron control for exactly timing and duplicating welding operations



accomplished without periodic check-out.

The rectifier used with the dekatron control, of a new principle, is said to be more precise, with a wider range of heat control. The phase shift control provides an approximately linear adjustment of the secondary current with a stepless vernier having 10 equal divisions of heat adjustment.

An added feature of the new control system is the use of plug-in sub-assembly units designed to minimize down-time and facilitate the adding of extra welder functions.

*Circle 223 on postcard for more data*

### LINDE AIR PRODUCTS CO.

**ARGON-HYDROGEN**—A shielding gas for electric welding—H-15 argon mixture—has been tested and used successfully to shield Heliarc welding of stainless steel, Monel, Inconel, and other metals. X-ray testing of the welds has shown that the resulting joints are sound and clean. The presence of hydrogen in the mixture permits relatively high arc voltages resulting in high welding speeds. Substantially reduced flow rates provide adequate shielding to the weld zone, compared to volume of helium needed.

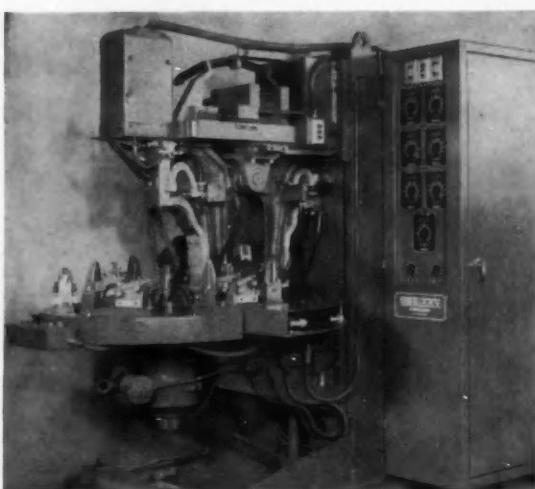
*Circle 224 on postcard for more data*

### SCIAKY BROS., INC.

**INDEXING WELDER**—Rotary indexing has been provided with a standard single phase weld-machine. The six station air operated projection welder operates at 150 kva at 50 per cent duty cycle. Electrode force is 4800 lb at 80 psi. Functions include squeeze, weld, quench, post-heat, hold.

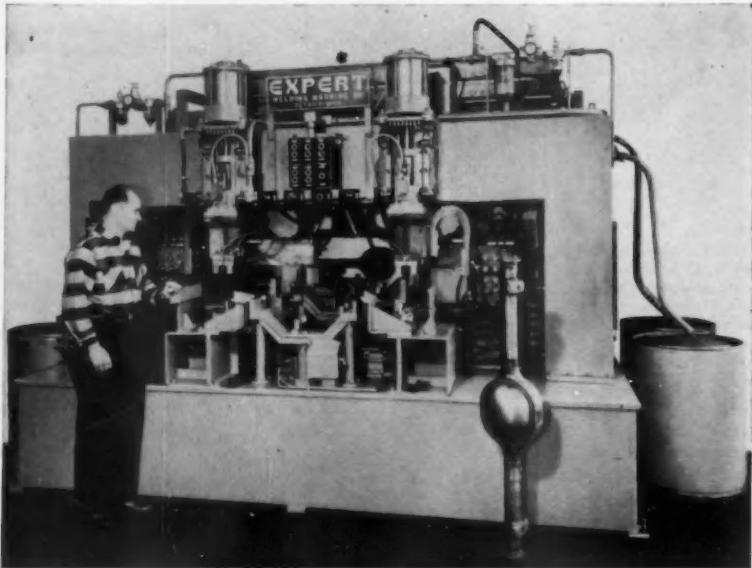
Designed for bumper guard welding, the bumper guard mounting bracket is placed over a locating pin and sprung-held. The hold-down is depressed in loading the bumper guard shell. At the welding station both parts are pressed into final location by air, and weld pressure is applied by the vertical yoke. Both sides are welded at once.

*Circle 225 on postcard for more data*



Sciaky dial feed rotary indexing machine for bumper guards. Production is 1000 per 50 min.

## *Welding Equipment* SECTION



### **EXPERT WELDING MACHINE CO.**

**AUTOMATED WELDER** — Automatic welding machine utilizes automation concepts to combine projection welding and carbon dioxide arc welding in the assembly of two stamped spring support brackets to an automotive rear axle housing. The welder, which produces 130 welded assemblies per hour at 80 per cent efficiency, is an in-line transfer type machine in which the parts are automatically transferred from station-to-station with a mechanism powered by an air motor.

In operation, the two spring support brackets are first loaded into the fixture at the front of the machine by the operator. Then he loads the housing into the fixture and pushes a cycle control button. A locator pivots up and contacts the housing banjo surface locating it in correct radial location and inserting an expansion locator that contacts the inside of the banjo flange to center the housing in the machine. The two projection heads then come down and weld the brackets to the housing. The pivot locator retracts, the heads retract

and an air powered lifting device raises the welded assembly. The transfer mechanism travels under the part and the lifter retracts, thus depositing the part on the transfer mechanism. This mechanism is utilized to move the part between all of the stations.

While transferring between station two and three, a cam turns the part so that the banjo is flat for the next operation. In the third station, another pivoted locator positions the part radially and centrally for the entry of centers in each end of the part. The live center which enters the part has an air-operated taper lock thus positioning the part in correct axial location for the welding operation. The driving center which enters the other end of the part is serrated and powered by an electric drive motor. When the part is properly positioned, it is rotated for the inert-gas welding operation performed by the four welding heads.

After finish-welding, the axle housing assembly is lowered to the transfer mechanism, and moved to station four where it is deposited on slide rails at the rear of the machine.

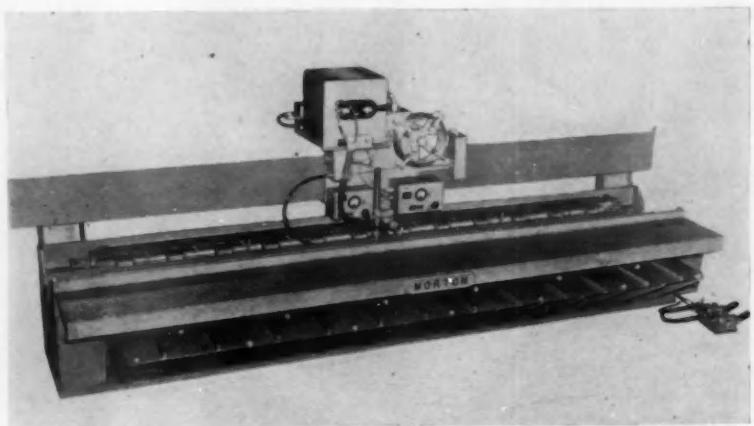
The welder is totally air-powered, except for the inert gas welding operation in which a one-hp motor drive rotates the part. Wire for the inert gas welding operation is fed automatically to the heads from hoppers at the side of the machine. The unit is about 8-ft. high and occupies a floor space about 10 ft by 10 ft.

*Circle 226 on postcard for more data*

### **MORTON MANUFACTURING CO.**

**SEAM WELDER** — Stake welding machine is designed for automatic arc welding of long flat sheets. It includes side loading platforms with ball transfer rolls to aid in material handling and features such as positive clamping, accurate gaging and water-cooled copper back-up bar. The machine will handle flat stock up to  $\frac{1}{4}$ -in. thickness. Various lengths and heights can be supplied.

*Circle 227 on postcard for more data*



# *Specialized Equipment Section*

COMPONENTS  
CONTROLS  
DIE SETS  
DRIVES  
DUST COLLECTORS  
MARKING UNITS  
NUT RUNNERS  
PORTABLE TOOLS

AUTOMOTIVE INDUSTRIES

1956 MACHINE TOOL &  
PRODUCTION EQUIPMENT ISSUE

AI

*what are diamond tools made of?*



{ *integrity*  
*experience*  
*craftsmanship*  
*value*

For thirty years "Koebelite" has been an outstanding name in industrial diamonds. The Koebel Company, one of the largest in the field, has pioneered a seemingly endless procession of diamond tool advancements that have greatly influenced diamond tool practice throughout the world.

\* "CEMENTED DIAMOND PARTICLES" introduces a totally new concept in diamond tool engineering and design.

In almost every industry, wherever diamond tools are used, there exists the possibility that CDP can do the job better, more economically. This material is particularly adaptable to existing and newly planned automatic production machinery. Details supplied on request.



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**DIAMOND TOOL CO.**

First to give industry the benefits of Diamonds set in Powdered Metal.  
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**AI**

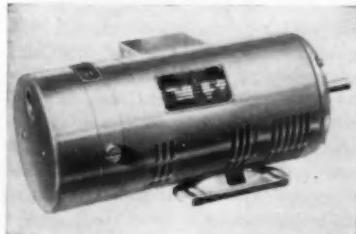
# Specialized Equipment

## SECTION

**FOR ADDITIONAL INFORMATION  
please use reply card on PAGE 163**

### DYNAMATIC DIV., EATON MANUFACTURING CO.

**SPEED DRIVE** — Adjusto-Spede Drive is equipped with integral electrically operated friction brakes or integral speed reducers. Two brake ratings, 18 and 36 lb-in. of torque, are available. Speed reductions are obtainable from 5 to 1 to 100 to 1, depending upon the drive horsepower rating. The small single package



drive is a combination of a-c constant speed induction motor, eddy-current coupling and electronic control. Standard modifications include either the friction brake or speed reducer.

Connection to a standard power line is the only wiring required. All drives have a continuous constant torque rating through a 25 to 1 speed range. Electronic control reportedly insures speed stability of plus or minus two per cent of top speed at any point within the operating range.

**Circle 228 on postcard for more data**

### FENWAY MACHINE CO.

**ELECTRIC NIBBLER** — Model HN portable nibbler is rated to handle stainless steel of all types up to 10 gage; milder steels and non-ferrous metals to 8 gage. The nibbler will follow patterns or templates and will cut from any angle. It will also cut contoured or corrugated stock. Minimum cutting radius is six in. Cutting action is provided by a high speed, tool-steel punch and die which takes a  $\frac{1}{4}$ -in. slug of metal with each stroke. Speed

at full load is 600 strokes per minute. Punch and die are removable and may be resharpened or replaced as necessary. Motor is the universal type, approximately one hp. Also available, as optional equipment, is a ground safe fuse cap and fuse for automatic protection against the following conditions: nibbler is over-heated; punch and die are too dull for safe cutting; operator is forcing cut; or nibbler is overloaded with metal of heavier gage or hardness than its rated capacity.

**Circle 229 on postcard for more data**

### CARTER CONTROLS, INC.

**ROTARY ACTUATOR** — Hydraulic or pneumatic control device has an internal helix arrangement which converts the in-line motion of a hydraulic or pneumatic cylinder into a rotary movement. This unit is applicable to the remote control of valves, and can be operated with air, gas or hydraulic pressure. Actuators are provided with "fail-safe" provisions if desired.

The rotary actuator can be designed to produce any reasonable de-

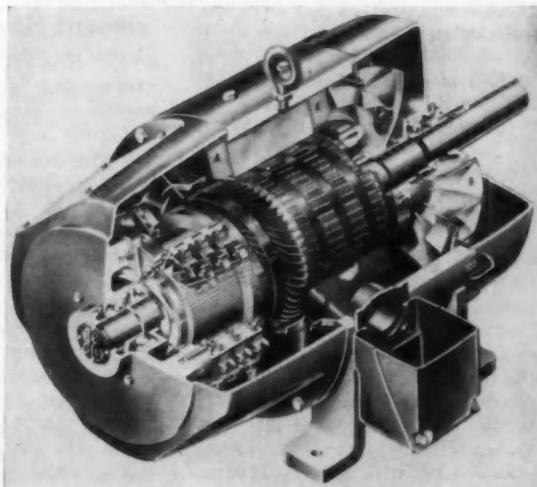


gree of rotary movement desired from 0 to 360 deg, or more if necessary, by increasing the overall length of the helix piston rod assembly. It can be made to stop at any rotation point through the use of switching. By using a slip clutch in the unit, many varied rotary sequences can be ob-

### GENERAL ELECTRIC CO.

**D-C MOTOR** — Design features of the Kinematic motor shown here are (A and B, respectively) exciting and communicating field coils insulated with mica, glass, and other inorganic materials, with coils encapsulated in a heat-resistant polyester compound; (C) brush rigging, with brush holder yoke of heat-and-moisture-resistant polyester glass; (D) lightweight aluminum fan and improved ventilation system. Motor ratings from 1 to 150 hp are available.

**Circle 230 on postcard  
for more data**



## Specialized Equipment SECTION

tained. It is thus possible to obtain unlimited rotation by a series of partial rotation cycles. A wide range of lb-in. torque requirements are met with five standard models, ranging from a three-in. bore with 350 lb-in. at 100 psi, to an eight-in. bore with 3360 lb-in. of torque at 100 psi.

Circle 231 on postcard for more data

### THOR POWER TOOL CO.

MUFFLER — No. 2 series of air driven tools incorporates an exhaust muffler which is said to reduce noise by 75 per cent. The muffler consists of a steel sleeve, with 24 perforations, providing a large expansion chamber for exhaust air before it reaches outside atmosphere. Coupled with an internal three-stage muffling system, the sleeve and its acoustical pattern of holes break up and absorb air motor sound. The new muffling sleeve can be installed on units now in use, as well as ordered optionally on new tools.

Circle 232 on postcard for more data

### MICRO SWITCH DIV., MINNEAPOLIS-HONEYWELL REGULATOR CO.

LIMIT SWITCH—Model 1LS1 heavy-duty limit switch provides control of two independent circuits, and features sealed construction and high electrical capacity plus adjustability. It is suitable for a wide range of industrial applications where space is limited. Seals on the actuator shaft and between the cover plate and the enclosure prevent entry of foreign matter into the switching chamber.

The switch is equipped with a roller-arm actuator which can be adjusted through 360 deg with positive locking in any position. Actuation can be clockwise, counter-clockwise or in both directions. The actuator head may be removed and faced at any of four positions at 90-deg angles.

Circle 233 on postcard for more data

### MINNEAPOLIS-HONEYWELL REGULAR CO., INDUSTRIAL DIV.

SATURABLE REACTOR — Electronic proportional control is used to automatically regulate the operation of saturable core reactors for resistance, high-frequency or induction furnaces. The system comprises an electronic controller with a specially designed unit known as an Electr-O-Volt controller. It provides proportional control with automatic reset,

**POWER PACKAGE —**  
Series 78 pipeless power units are designed to meet requirements of a wide range of light-duty industrial applications, such as clamping, indexing, and transfer operations. They are recommended for systems requiring operating pressures up to 1000 psi. Units consist of an electric drive motor, an oil-hydraulic pump, and a control circuit. Three pump capacities available are: 2.2, 3.7, and 5.2 gpm rated deliveries at 1800 rpm and zero pressure.

Circle 234 on postcard for more data

### VICKERS, INC.



and is designed for applications where it is undesirable to interrupt the current for control purposes.

In operation, the reactor (which functions like a valve in a fuel heating system) regulates electrical current to the furnace. Initially this current is fed the reactor by power amplifiers and boosted to a level strong enough to operate the reactor. To provide the necessary control, the electronic controller and Electr-O-Volt unit measure temperature and any deviation from the desired control point and send a d-c signal to a power amplifier, which in turn causes the reactor to vary the power fed the furnace.

Circle 235 on postcard for more data

### HOWELL ELECTRIC MOTORS CO.

STEP - STARTING MOTOR — Two-step-starting and three-step-starting motors are designed to reduce starting shock to machines, minimize line disturbances and meet power company requirements for limited current inrush. Locked rotor current is reduced to approximately 65 per cent of normal, and starting torque on the first step is about 50 per cent of full-voltage starting torque. The firm is building the motors in all standard enclosures, from five to 200 hp.

For two-step starting, half of the motor winding is energized across the line as the first magnetic contactor closes. At the end of a timed cycle, the second contactor closes to bring in

the second half of the winding in parallel with the first. In typical three-step starting, the motor starts with reduced voltage on the first winding, accelerates as full voltage is added to the first winding and then, in the third step, reaches rated speed as the second winding is brought in at full voltage. Even less current draw than is needed with these standard steps can be provided.

Circle 236 on postcard for more data

### WESTERN FELT WORKS

FELT MOUNTS — Westsorb adhesive-coated felt mounts for use under machinery are now being offered to reduce noise and vibration. They are adhesive-coated on both sides, to permit quick installation or re-location of equipment without bolts. The wool felt is resistant to oil, grease and acids. It is designed to hold up well under repeated impact loads. It is available in several thicknesses, cut to size or in flat sheets.

Circle 22 on postcard for more data



#### LINDBERG ENGINEERING CO.

**HEATING ELEMENT**—Corrtherm, an entirely new electric heating element for atmosphere heat treating furnaces, consists of corrugated sheets of nickel chromium which practically cover the entire walls of the furnace. These sheets are hung from alloy hooks extending through the roof, making the installation and replacement extremely simple. No supports or hangers need be built into the walls.

The large size is necessary to accommodate amperages ten to twenty times greater than in the previous types of elements. The greater surface area results in lower surface temperatures and therefore longer element life. The voltage is so low that accidental contact with the elements when loading or unloading the furnace cannot be felt. This is also true of outside electrical connections which need not be insulated. The secondary of the transformers is a single turn of very heavy aluminum buss bar, which connects directly to the elements.

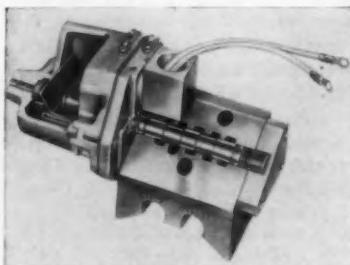
In forced convection furnaces where high temperature fans force the hot gases through the charge being heated, the elements act as a direction baffle, heating the gases at the same time. In very large furnaces, elements are not only hung adjacent to the walls but can be suspended into the heating chamber itself. No retort is needed in pit-type furnaces.

Circle 237 on postcard for more data

#### ROSS OPERATING VALVE CO.

**VALVE**—Comet II multi-purpose valve includes more than 100 model variations designed for a wide range of air and oil pressure applications. For example, it can be adapted to power a welding gun, air-operated transfer mechanisms, air riveting and testing fixtures. The valve completes a valve cycle within 0.033 sec, according to the announcement.

It is available with  $\frac{1}{4}$  or  $\frac{3}{8}$  in.

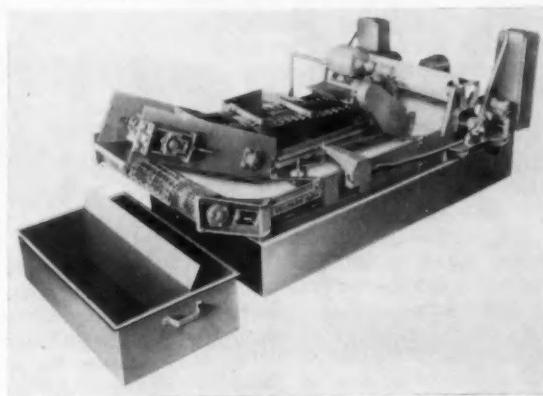


AUTOMOTIVE INDUSTRIES, September 1, 1956

#### INDUSTRIAL FILTRATION CO.

**MAGNETIC FILTER**—Delpark magnetic separator and filter for separation of ferrous sludge and abrasives from coolant uses a new method of gravity flow and magnetic attraction. Through the efficiency of the magnets in handling the great swarf load, filter size has been reduced while flow capacity has been increased. The unit is continuous, full flow capacity, self cleaning, and fully automatic.

Circle 238 on postcard for more data



pipe tap for inline, manifold or base mounted; in single solenoid spring return, double solenoid momentary and double solenoid three position. These solenoid direct operated four-way spool-type valve arrangements can be used for straight-way or three-way functions by plugging ports.

The valve measures  $7\frac{1}{4}$  by  $3\frac{1}{2}$  by  $3\frac{1}{8}$  in. Flow capacity is equal to a  $\frac{1}{4}$ -in. diam. hole.

Circle 239 on postcard for more data

#### NORTON CO.

**RESIN WHEEL**—Resinoid bond B11 used in conjunction with new molding and firing techniques, is said to insure a much more uniform structure than has been possible in resinoid wheels previously. Increased uniformity of structure or spacing of abrasive grains throughout the wheel is claimed to offer more accurate and uniform work, improved surface finish, reduced diamond truing tool costs as well as lower unit grinding costs. Changes in the automatic cycle need not be made to compensate for variations in grinding action.

Circle 240 on postcard for more data

#### LORD MANUFACTURING CO.

**LATTICE MOUNTINGS**—Bonded-rubber lattice mountings are designed to provide a high degree of vibration and noise isolation, particularly in the low-frequency, high-amplitude range. A complete line of this new mounting has been developed and is now being produced with capacities ranging from 250 to 300 lb and static deflections from  $\frac{1}{4}$  to  $1\frac{1}{2}$  in.

Resembling a sandwich in construction, the mountings feature a latticed rubber section which is bonded to

horizontal steel plates at the top and bottom. The patented lattice design permits the shock load to be carried by the rubber in shear, providing a high degree of horizontal stability.



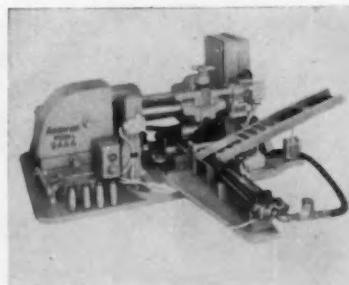
Lubrication is never required. Noise transmission is eliminated. The damping characteristic of the elastomer stops excursion of machinery when passing through resonance in starting or stopping.

Circle 241 on postcard for more data

#### ACROMARK CO.

**MARKING MACHINE**—Model 9AAA with Acrojet assembly, an automatic motor-driven machine, features a jet of air to position the work and then eject it after marking.

The machine is for marking steel

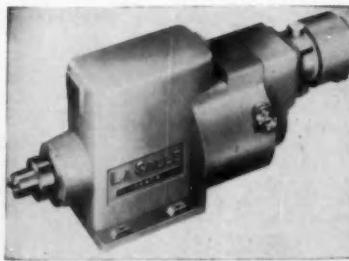


## Specialized Equipment SECTION

parts such as bushings, collars, gages, rings, sleeves, taps, mills, drills and other cylindrical or tubular type parts. It has a seven-in. stroke and will mark parts up to two-in. diam in the standard machine, or larger when the oversize frame is used. Standard operating speed is 36 strokes per minute, but this can be altered by a single gearing change when easily fed small parts are to be marked.

Fully automatic operation is provided. When the chute feed is lined up with a conveyor to bring the work to the machine, each part is moved forward into marking position by the Acrojet as it reaches the bottom of the chute. After marking, the Acrojet ejects the marked part onto a "carry-away" conveyor and automatically positions the next part.

**Circle 242 on postcard for more data**



thin-walled areas without danger of fracture. The clamping torque can be repeated from cycle to cycle within 10 per cent. Operations, such as loading, the work cycle, gaging, indexing and unloading, and including power clamping and unclamping, are performed automatically.

**Circle 244 on postcard for more data**

### JOSEPH T. RYERSON & SON, INC.

**STEEL**—E-Z-Cut steel plate is the company's newest leaded steel, intended for making die bases, jigs, molds, and other products in which considerable machining is involved. Leaded steel plate has greater machinability than steel plate without lead.

**Circle 243 on postcard for more data**

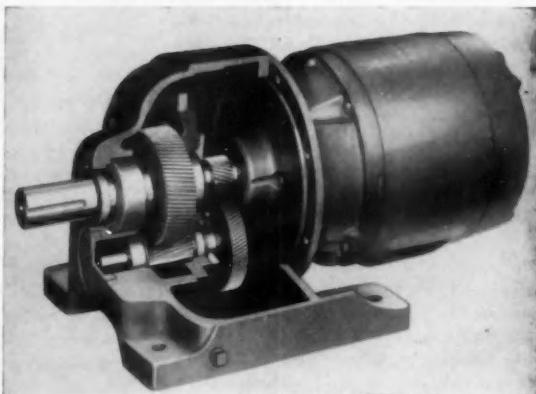
### LASALLE TOOL CO.

**POWER WRENCH** — A two-speed, fully automatic power wrench with controlled torque is designed for use with various types of machine tools. The wrench is synchronized with the machine cycle to give automatic engaging and disengaging of parts, and operates on conventional machine tool principles—with high speed, low torque approach; low speed, high torque clamping; and high speed, low torque return.

The unit features a fluid motor drive which is said to facilitate the clamping of light parts or parts with

**GEARMOTOR** — Phantom view of Link-Belt Gearmotor, part of a completely new line. Units range up to 30 hp; output speeds range from 280 rpm down to 6 rpm. Type DF double reduction Gearmotors have ratios from 6.2 to 1 through 31.4 to 1 and transmit up to 30 hp. Type TF triple reduction units have ratios from 38.4 to 1 through 292 to 1 and transmit up to 20 hp

**Circle 245 on postcard for more data**



### MILLER FLUID POWER CO.

**CYLINDERS**—An improved line of air and hydraulic cylinders features case-hardened, chrome plated piston rods. Teflon rod wipers and hydraulic rod seals, and black ferric oxide surfaces. Teflon wipers and seals are said to withstand temperatures from minus 100 F to 500 F and to be impervious to practically all known

chemicals including the fire-resistant, special and standard hydraulic fluids in current use. The black oxide finish provides rust protection in air cylinder operation.

This finish is now standard on the cylinder heads, caps, mountings, pistons, followers, tie rods, and the unplated portions of the piston rods.

**Circle 247 on postcard for more data**

### SCULLY SIGNAL CO.

**MONITOR**—Tested on fire detection systems, machine safety controls, furnace flame monitors, photocell intrusion alarms, and liquid-level controls, a new monitoring technique, which checks itself by a unique pulsation method, has been developed. The method requires few additional com-

### KELLER TOOL DIV., GARDNER-DENVER CO.



**WIRE-WRAP TOOL** — Powered by an air motor, tool makes solderless wrapped electrical connections with 14 and 16 gage wire in less than one second. Terminals may be made from commonly used metals and may be square or rectangular. Tool weighs 2 lb.

**Circle 246 on postcard for more data**

ponents to change conventional static systems to the self-checking design. It is said to be sufficiently basic to be used with electronic, electrical, mechanical, pneumatic, hydraulic, and nuclear systems. Fields of application include industrial heating control, aircraft and safety systems, process control instrumentation, and atomic energy protective systems.

Equipment protective devices and system monitors incorporating this method check themselves by periodically simulating the dangerous condition they are designed to detect. The simulated unsafe condition is introduced into the monitor, resulting in a continual safe-unsafe-safe-unsafe oscillation which holds the alarm off. Failure of the safe condition being sensed, or of the monitoring system itself, halts the required safe-unsafe oscillation and sounds the alarm or initiates corrective action.

**Circle 248 on postcard for more data  
(Turn to page 206, please)**

**NEW Black & Decker® Heavy-Duty  
Jig Saw is—  
POWER-BUILT  
FOR YOUR TOUGHEST JOBS!**



We don't buy motors—we build them!

The heart of your electric tool is the motor—completely built by Black & Decker! All the power you need and then some—because each motor is built for a specific tool and the job it must do. Black & Decker motors always stand up!



Cuts any angle up to 45°...on either side!

Rugged, versatile, highly accurate—cuts intricate patterns with precision!

Runs cool, offers smooth performance in wood—even 2x4's—and metal. Perfect balance reduces operator fatigue. Offers a full 1" stroke. Heavy-duty shoe will not wobble or distort under pressure. Armature and gear shafts

mounted on ball bearings. Full line of wood and metal cutting blades available. This B&D Heavy-Duty Jig Saw is priced lower than any comparable tool of similar capacity, in its field.

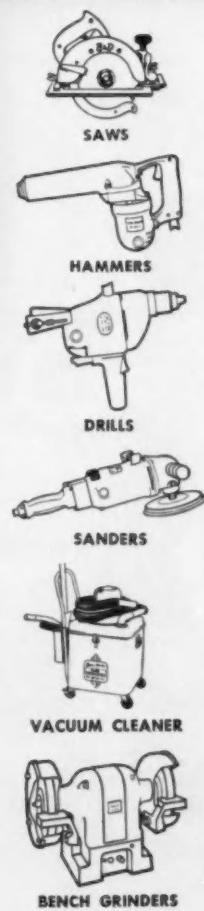
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Service . . . one of 44 Black & Decker factory service branches is located "next door" to you to give fast, efficient service and genuine replacement parts.



Look in the Yellow Pages under "Tools-Electric" for Nearest Distributor

**Black & Decker®**  
PORTABLE ELECTRIC TOOLS



*Passenger cars*



*Trucks*



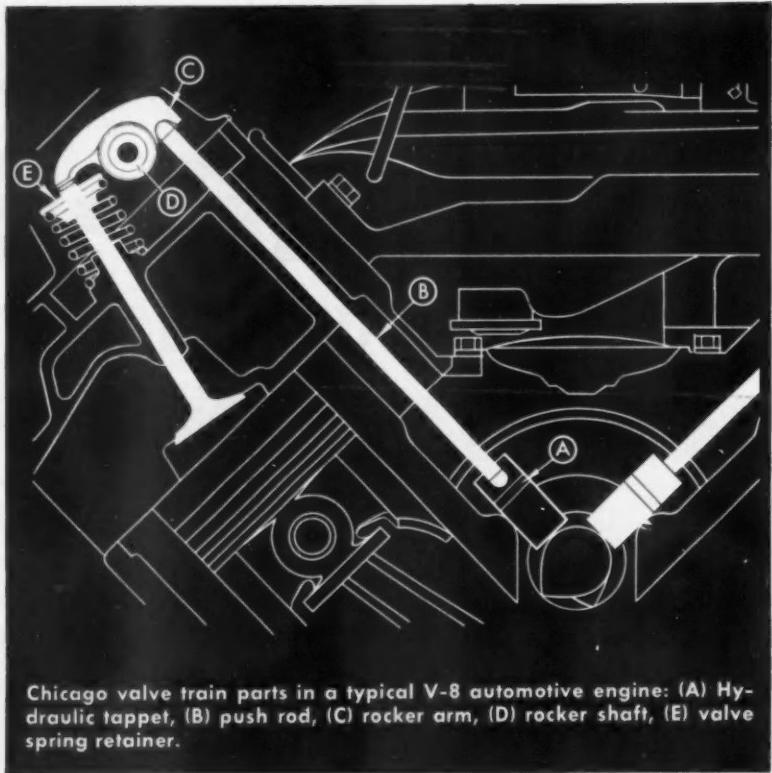
*Tractors*



*Diesels*



*Aircraft*



Chicago valve train parts in a typical V-8 automotive engine: (A) Hydraulic tappet, (B) push rod, (C) rocker arm, (D) rocker shaft, (E) valve spring retainer.

**When it comes to valve gear,  
leading engine makers come to  
CHICAGO**

Here at Chicago you'll find a single source for everything you need in valve gear. These specialized facilities are solving problems and saving money for leading engine manufacturers . . . and can do the same for you.

**Design and Engineering**—at Chicago you'll find valve gear engineering experience in depth . . . men who understand your problems and will work with your engineering staff in designing cam shafts and complete valve gear assemblies for any type of engine.

**Manufacturing**—Chicago is a leading manufacturer of valve train parts. Our complete line includes precision-made hydraulic and mechanical tappets; push rods in both lightweight tubular and solid styles; valve adjusting screws including new self-locking screws that cut assembly costs; valve spring retainers; rocker arms and rocker shafts.

**Testing**—we have complete laboratory and engine testing facilities.

*For the full story of how we can serve you, write our Tappet Division.*

**THE CHICAGO SCREW COMPANY**

DIVISION OF STANDARD SCREW COMPANY • ESTABLISHED 1872

2801 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS

# Free INFORMATION SERVICE

Use either of these postcards for Free Literature listed below, or for more information on New Production Equipment and New Products described in this issue.

USE THIS POSTCARD

FREE LITERATURE

## Shafting

1

A four-page bulletin describes the new "60 Case" hardened and ground material for shafting, rolls, guide rods, etc., and lists diameters and lengths in current production. *Thomson Industries, Inc.*

## Control Valves

2

Three-way and four-way directional control valves for fluid power systems up to 3000 psi are covered in Bulletin 80300, 16 pages. *Oilgear Co.*

## Descaling Machines

3

Bulletin 608, 16 pages, covers equipment for continuous, mechanical descaling of steel sheet and strip by shot blasting, and includes construction details, actual installations, and specifications. *Pangborn Corp.*

## Limit Switch

4

Bulletin 1600B, eight pages, describes a rotary cam limit switch for mechanical presses, which features fast external adjustment of the cams while the press is in motion. *Danly Machine Specialties, Inc.*

## Centrifugal Pumps

5

A complete line of cradle-mounted, general-purpose centrifugal pumps having capacities of from 5 to 2800 gpm and pressures of 10 to 525 ft total head is described in a 20-page bulletin (Form 7223-B) issued by *Ingersoll-Rand Co.*

## Roll Grinders

6

Catalog V-56, 26 pages, lists heavy-duty roll grinders which are available in 36, 44, 50 and 60 in. swings, with center lengths of from 10 to 24 ft. *Landis Tool Co.*

## Dragline Conveyors

7

Book 2497, 24 pages, describes both the overhead and in-the-floor type of Truckveyor, a dragline conveying medium for industrial trucks. *Link-Belt Co.*

## Rectangular Motors

8

Rectangular-shaped motors, which are available in 12-v and with outputs of up to 115 oz in., are described in an illustrated catalog issued by *Leece-Neville Co.*

## Cap Screw Torque

9

A four-page folder discusses the principles of torquing for cap screws and lists recommended assembly torques for the company's own cap screws and place bolts. *Cleveland Cap Screw Co.*

## Unloading Machines

10

A 16-page catalog describes typical applications of machines for automatic press unloading operations, and includes information on the overhead unit, the portable model for floor operations, and on turnover and transfer machines. *Sahlin Engineering Co., Inc.*

(Please turn page)

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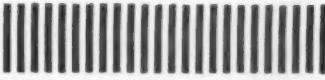
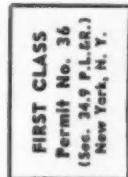
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**Tool Steel Furnaces 11**

Bulletin 97-HS, four pages, covers a line of furnaces designed to harden high-carbon and high-speed tool steels without scale, decarb, or carburization. *Furnace Div., Lindberg Engineering Co.*

**Synchronous Motors 12**

Construction features of large end-shield bearing synchronous motors, designed for a high degree of protection in a variety of direct-connected or geared applications, are described in Bulletin 05B8305, issued by *Allis-Chalmers Manufacturing Co.*

**Molybdenum 13**

*Moly Iron Castings* is the title of a series of bulletins that will present technical information and case histories on the use of molybdenum as an alloying element in gray iron castings. The first two in the series, Bulletins 1 and 2, are now available. *Climax Molybdenum Co.*

**Vapor Degreasers 14**

A 24-page manual discusses the use, operation and maintenance of various types of vapor degreasing equipment and includes perspective and cutaway schematic drawings. *Degreaser Div., Circo Equipment Co.*

**Silicone-Glass 15**

Laminates of silicon and glass are described in a four-page brochure which lists various end products such as forms, terminal boards, and tubes and rings for transformers and motors. *Dow Corning Corp.*

USE THIS POSTCARD

**Torque Converter 16**

Bulletin 507 explains the design and application of a new three-stage torque converter Series 13,800 which incorporates one standard output shaft assembly and three input arrangements. *Hydraulic Div., Twin Disc Clutch Co.*

**Powder Metal Products 17**

Engineering Manual E-56, 52 pages, contains data on the properties and application of Oilite materials. A 12-page insert lists over 1000 standard Oilite sleeve, flange and thrust bearings, and cored, solid bar and plate stock. *Amplex Div., Chrysler Corp.*

**Hydraulic Tubing 18**

Bulletin 12-6 contains information on steel tubing for hydraulic cylinders and fluid lines, including tolerances, mechanical properties and bursting pressures. Also listed are cold finished steel bars for pistons, square steel heads and caps. *Joseph T. Ryerson & Son, Inc.*

**Spot Welder 19**

Bulletin 339 covers a four-function spot welder which incorporates the new type dekatron tube control, and also lists standard and optional machine features of spot and seam welders. *Sciaky Bros., Inc.*

**Calcium-Base Grease 20**

Technical Bulletin 46 describes a calcium-base grease compounded for use under severe conditions of dirt, moisture, and low speeds with high loads, in such applications as bearings, open gears, sprockets, chains, slides, cams, cables, couplings and linkages. *Sun Oil Co.*

**Carbide Tools 21**

Detailed information on a complete line of carbide products including standard blanks, throwaway blanks, standard tools, die sections and punches, die inserts, etc., is presented in a revised 32-page booklet made available by *Allegheny Ludlum Steel Corp.*

**Mechanical Tubing**

New tolerance tables and additional size ranges for square, rectangular, and round carbon and stainless steel welded mechanical tubing have been made available in handy reference form, either as a chart or pocket-sized booklet. Indicate choice of chart or booklet, and address request to *Steel and Tubes Div., Republic Steel Corp., 224 East 131 St., Cleveland 8, Ohio.*



THE STRANGE CASE  
OF THE

## MISSING PRODUCTION COST

ONCE upon a time there was an accounting department that was used to heavy costs to replace worn-out production tools. One month, when they were checking out their figures and preparing cost analyses, part of this cost was missing. Of course this bothered the accounting department because the treasurer of the company needed this cost so he could growl

at salesmen when they turned in their expense accounts. They started a systematic check—the kind that only accountants can dream up, and found that the production department had started making a lot of parts out of Copperweld Leaded Alloys—the steels with "built-in productivity." Because of its extreme machinability, they were enjoying not

only faster feeds and speeds and high production savings but production tools were lasting much longer—in some cases as much as 10 times as long. The story has a happy ending because everybody was delighted with lower production costs—even the treasurer. He hasn't snarled at a salesman's expense account in months.



**COPPERWELD STEEL COMPANY**

Steel Division • Warren, Ohio

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

For further details on Copperweld Leaded Alloys, write for free booklet, "Lead Treated Steels."



# NEW PRODUCTS

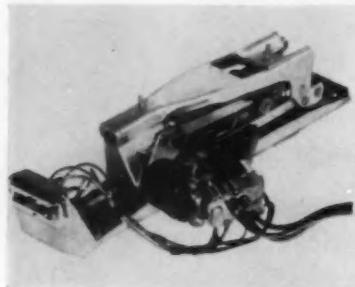
## AUTOMOTIVE - AVIATION

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 163

### Seat Adjuster

Featuring a new electro-multimatic drive unit, a six-way seat adjuster is said to solve the problems in some of the newer cars arising from the seat being so low that no space is available for the steel torque tubes generally used for cross-coupling the two tracks.

The drive unit is composed of a



single electric motor coupled to a transmission having selective drives engaged by means of solenoids energized simultaneously with the starting of the motor by the driver-operated master switch. Driving cables transmit the torque from the transmission unit to slave units in the two tracks. These are inter-coupled to form an unbroken drive to each side of the seat, so that once assembled there is no possibility of the two sides getting out of synchronism, it is stated. *Ferro Stamping Co.*

Circle 25 on postcard for more data

### Expansible Compounds

Two thermosetting, self-curing polyisocyanate foams for insulating and reinforcing voids between structural members are now available. Designated as Scotchfoam Brand Expansible Compound Type A and Type 1 they are adapted to filling cavities where light weight, structural strength, stiffening, vibration dampening and durability are desirable factors.

Both compounds are a two-part liquid formulation which, when mixed

with a catalyst under proper conditions, can be foamed-in-place to produce a rigid cellular material that will not break loose, settle or sag. Application to desired areas may be made by pouring or spraying. Scotchfoam 1 has a volume expansion of approximately 20 to 1.

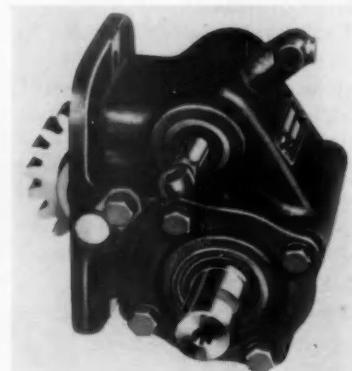
Typical uses of Type A polyisocyanate foam include the insulating and reinforcing of voids in aircraft tail assemblies and other structures. Type 1, for example, can be applied between exterior and interior floor panels on railroad passenger cars to provide sound-deadening and insulation characteristics. *Minnesota Mining and Manufacturing Co.*

Circle 26 on postcard for more data

### Power Take-Off

The Model "JN" Spicer power take-off is designed to fit Chevrolet, Warner T-98-A, and New Process four-speed transmissions, and delivers up to 75 per cent of engine speed, particularly desirable when used with late model hydraulic pumps. It is available with 13/16 in round, 1 1/8 in. round, or 1 1/8 in. tapered output shaft. Cable control is optional.

The manufacturer also states the

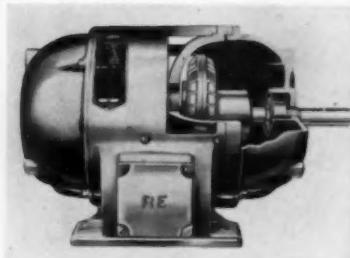


unit can be supplied for mounting directly to certain Hydrex, Vickers, and Commercial Shearing pumps. *Dana Corp.*

Circle 27 on postcard for more data

### Motor, Unique Coupling

A new line of motors, called Flexi-Shaft, is equipped with a "dry-fluid" coupling which uses steel shot instead of a true fluid. The coupling is mounted inside the motor's frame and the entire unit is supplied as a single-frame power package. Many combinations with magnetic brakes and gear reducers can be supplied for



unusual drive problems. Primary features are said to be: (1) smooth load acceleration, (2) protection against equipment jamming, and (3) the ability to start heavy loads on lower, actual operating horsepower.

The "dry-fluid" coupling is an adaptation of the Dodge Flexidyne drive. Its operating principle is based on centrifugal force throwing the steel shot to the perimeter of the housing. The housing, in turn, is keyed to the load and accelerates as the rotor gradually becomes "imbedded" in the tightly-packed shot.

Flexi-Shaft motors are produced in ratings from 1/2 through 15 hp. *Reueland Electric Co.*

Circle 28 on postcard for more data

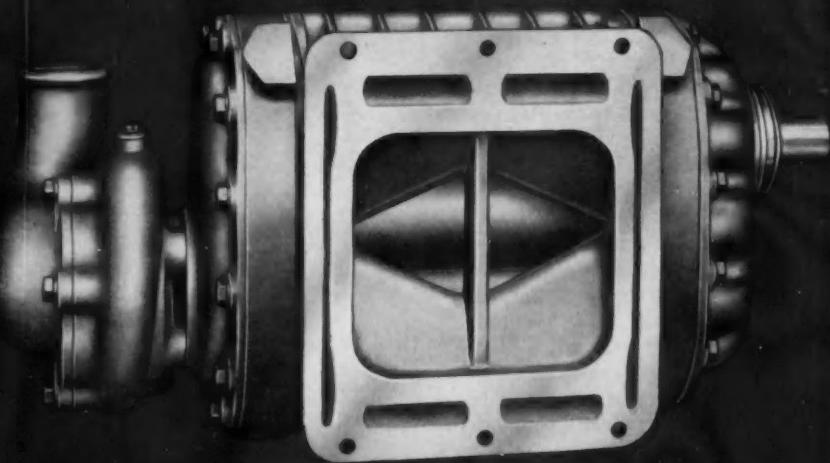
### Welding Fasteners

THE availability of welding fasteners in a wide variety of sizes and types to meet customer specifications has been announced. The fasteners include welding screws, spade and bent spade screws, collar studs and nuts, and designs to meet special applications. *Russell, Burdsall & Ward Bolt and Nut Co.*

Circle 29 on postcard for more data

# SCHWITZER

# SUPERCHARGERS



**ROOTS TYPE, POSITIVE DISPLACEMENT**

*Durable · Efficient · Economical · Lightweight*

Standard, single or multi-staged units can be suited to special applications in the aircraft, industrial and guided missile programs.

*As your supplier, Schwitzer Corporation assures you of advanced design and economy in fluid flow and vibration damping products.*

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**SCHWITZER**  
**CORPORATION**  
INDIANAPOLIS, INDIANA

# METALS

*Whole Economy Will Be Affected by Steel Wage Settlement.  
Lead Demand Steady; Titanium Output Rising; Tin Price Up.*

By William F. Boericke

## Cost of the Steel Strike

Settlement of the steel strike was followed quickly by price increases. These were somewhat less than had been generally expected, and reflected the reluctance of the steel producers to set the pace to the full extent for another inflationary round in the wage-price spiral.

Yet there is no doubt that in its direct and indirect consequences, the steel wage settlement will prove to have been extremely costly to the whole economy. It means higher costs, hence higher prices, for the multitude of products made wholly or partly from steel. More important, it will set the pattern for inflationary wage boosts in other industries. This has already occurred in the aluminum industry settlement.

Specialty steel manufacturers followed the lead of the integrated producers in advancing prices. High speed cutting steel was hiked eight cents a pound, with extra charges up eight per cent. Stainless and high nickel steels went up 6½ per cent. Manufacturers of rivets, bolts, spikes, and similar products were not caught napping. Canadien steel producers raised their prices about five to eight dollars per ton, or 25 per cent less than in the United States.

It appears at least debatable whether steel prices will not be raised again before the end of the year. Some important producers are dissatisfied with the advance and question if it is adequate to cover depreciation and the cost of the expansion program envisioned in the years ahead.

Estimates of the loss of steel production from the strike are 11-12 million tons and the cost at over \$335 million. While most metalworking plants squeezed through the strike in fair shape, thanks to larger inventories than were generally revealed, the construction industry was hard hit and the freight car builders were seriously handicapped from lack of structurals. Sheets, however, remained in relative abundance during the five-week strike.

## Scrap Market Strong

Pig iron prices were advanced \$2½ per ton and it is a foregone conclusion that the price of iron ore will be raised although this may not occur until later in the year. Steel scrap prices had started to rise long before the strike settlement and in mid-August the composite price of *Iron Age* had gone to \$55.50, equal to the all-time high established last April. The upsurge

anticipated strong mill demand to speed production pending resumption of hot metal production by blast furnaces. Shutdown of the mines and tying up of Lake boats deprived stockpiles of iron ore that may be needed to carry on operations during the winter freeze on the Lakes.

## Copper Price Improves

By mid-August the copper producers were more cheerful. All price changes were up. On the London Metal Exchange, copper had advanced from 32½ cents to over 40 cents per pound. The conservative Prain group, after cutting its Rhodesian-produced copper to 34¾ cents in early July, boosted its price to 37½ cents. Of more importance to domestic consumers was the action of the custom smelters who raised their prices in a series of steps to 39¾ cents per pound, from 37½ cents. This brought the custom smelters' price to practically the same as the producers' official 40 cent price.

Yet copper sales failed to improve to any great extent, although there was a better demand abroad. It isn't certain whether this mirrored actual consumer demand, or inventory buying by the fabricators who became alarmed by the Suez imbroglio. European users, unlike American, had apparently allowed their inventories to decline before the break in copper prices occurred, while the reverse was true at home. As a consequence, the Connecticut brass mills ruefully admitted that incoming orders had been drastically reduced as customers tried to work off their high priced inventories.

This was all too vividly portrayed in the June statistics, which showed copper stocks held by brass and wire mills totaled over 451,000 tons on July 1, the highest in nine years. At the same time, new orders called for the use of only 88,800 tons of metal. This compared with new orders totaling 134,700 tons a year earlier. However, it was reported the brass mills were again in the market for September delivery copper. This corresponds with the expected resumption of buying for 1957 model automobile production. Many of the automobile manufacturers were closed down for model changeovers which should be completed by September 1.

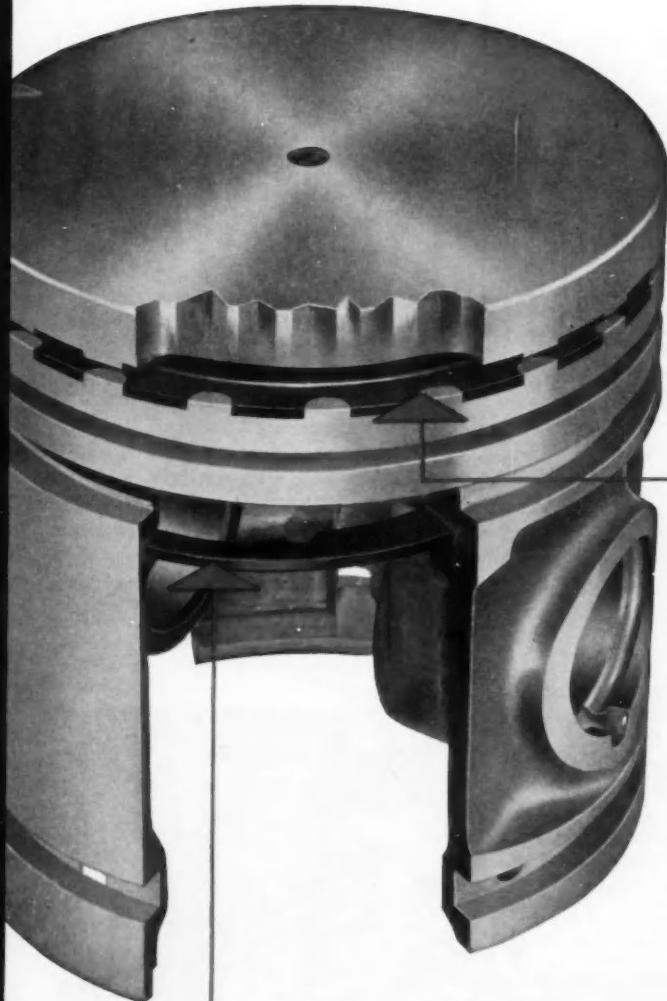
## Pick-Up Seen for Zinc

The July zinc statistics were quite as bad as expected by the trade. Domestic shipments fell to 34,219 tons, the lowest reported for four years. With production maintained at the relatively high level of 83,000 tons for the month, stocks at the end of July climbed to 103,253 tons. This represented a steady increase from

(Turn to page 202, please)

# NOW!!

## STERLING CONFORMATIC\* PISTONS



**CONFORMATIC STEEL CONTROL MEMBER**, anchored at the pin bosses only, controls skirt clearance . . . hot or cold! The metered steel insert allows you to specify the piston clearance you want for your engine. (Clearances from zero to  $\frac{1}{2}$  thousandth inch are generally recommended.)

are  
available with  
**LOW COST**

### **Intra-Cast\*** **STEEL-LINED**

#### **GROOVES**

*Steel protection—top and bottom—gives sensationaly longer life to rings and grooves.*

This ring is *integrally cast* into the piston . . . positioned so that when the grooves are machined, the top ring groove is *lined with steel* and has islands of aluminum for ring cooling. This Intra-Cast steel-protected groove resists enlargement and materially reduces top ring land wear and rounding. And, it does it at far less cost than other methods.

\* Tradename Registered

**STERLING ALUMINUM PRODUCTS INC.**

ST. LOUIS, MISSOURI

# Average Speeds Slower for 1956 Le Mans Race

- UNDER
- NEW
- REGULATIONS

## 1956 Le Mans 24-Hour Race Results

Rank	Drivers	Make of car	Displacement (Cu in.)	Distance (miles)	Average speed (mph)
*1.	Sanderson-Flockart	Jaguar	210	2507.18	104.45
*2.	Moss-Collins	Aston-Martin	182	2497.08	104.05
3.	Gandilien-Trintignant	Ferrari	152	2446.71	101.95
4.	Swaters-Rousselie	Jaguar	210	2371.56	98.97
*5.	V. Frankenberg-v. Trips	Porsche	91	2356.39	98.18
6.	Hawthorn-Bueb	Jaguar	210	2340.84	97.34
*7.	Bicknell-Jupp	Lotus	67	2111.21	87.97
8.	Hugus-Bentley	Cooper	87	2102.58	87.61
9.	Bourillot-Perroud	Maserati	91	2046.68	85.28
*10.	Laureau-Armagnac	DB Panhard	46	1928.33	80.35
11.	Viellles-Thepenier	DB Panhard	46	1877.09	78.21
12.	Hédrich-Mason	DB Panhard	46	1838.62	76.53
13.	Bourel-Slotine	Porsche	78	1771.93	73.83
	Dumazer-Campion	VP	92	1752.78	73.03

Fastest lap: Hawthorn (Jaguar) 115.81 mph

Lap distance: 14,721 yd

\* Class winners

† Biennial cup winner

with his small Panhard racer.

Many changes had been introduced in view of the tragic accident during last year's event, where Levegh's Mercedes-Benz was catapulted into the spectators and killed 87 persons, injuring an equal number. In accordance with new regulations issued by the French Government, most of the roads used for this circuit were remade, and the usable

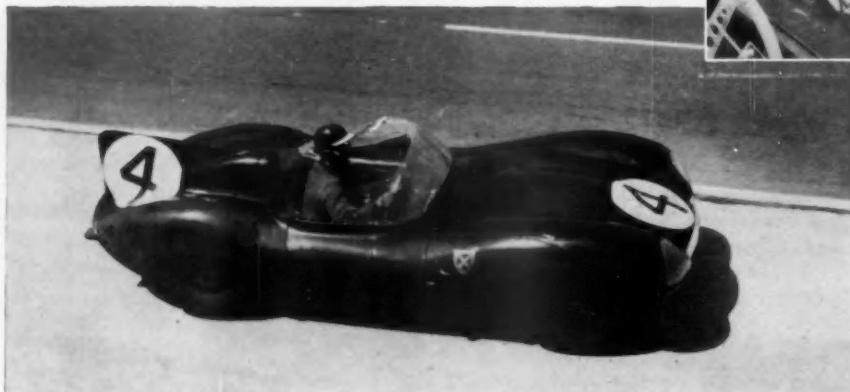
width limited to 23 ft. The pits were entirely rebuilt, and a pit run-in of 20 ft width had to be employed before a car was allowed to stop. Opposite the new pits the spectators' area was entirely remodeled. Separate signaling pits were provided at a spot where the cars passed by at relatively low speed. The cost of rebuilding

(Turn to page 178, please)

**N**INIAN Sanderson and Ron Flockart, driving a privately entered D-type Jaguar, won the 1956 24 hour race at Le Mans, France, on July 28 and 29. Practice speeds had indicated an overwhelming superiority of the official Jaguar team, but an accident occurred at the beginning of the second lap which eliminated two Jaguars and the fastest of a factory Ferrari team, and reopened a race which had already seemed a cut-and-dried affair. Four makes shared in first five places, and the factory-entered Porsche, a hastily prepared streamlined coupe, finished with little more than 6 mph difference in average speed between it and the winning car. Owing to new regulations, average speeds were rather lower than last year. Of 49 cars which had started, only 14 finished, no less than 16 having been eliminated by accidents, one of which caused the subsequent death of the French driver, Héry, who crashed



Lucas gasoline injection on Jaguar engine has not shown decisive advantages so far, developed toothless troubles and caused time loss by split pressure line.



Winning Jaguar driven by Scotsmen Sanderson and Flockart

Using

# DU PONT ELASTOMERS

NEOPRENE • HYPALON®



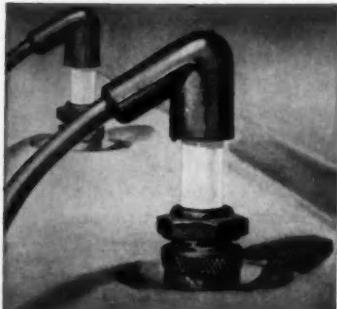
in Design

## HYPALON® solves some heat and ozone problems for resilient materials

HYPALON is completely unaffected by ozone, and, when it is compared with other kinds of rubber, it also shows unusual resistance to hardening at elevated temperatures (250°-350°F.). These two facts offer new opportunities to design engineers who are faced with the problem of using resilient materials in today's high-powered engines.

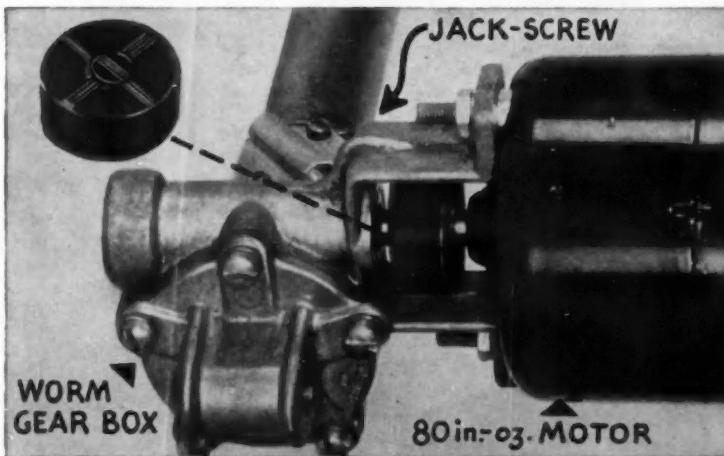
Already HYPALON is being used in molded spark-plug boots (see photo below) and ignition cable jacketing. In these applications, HYPALON's superior resistance to heat, plus the fact that it is completely unaffected by ozone, makes it a logical choice. HYPALON is the most economical choice in the long run, too, because it gives an extra-long service life to any product exposed to heat and ozone.

HYPALON has many other uses in the automotive industry. It's being used as a protective coating on rubber door stripping for automobiles because it protects against deterioration by sunlight and weathering. Durable HYPALON also can be compounded in an unlimited range of light-fast colors to blend with the modern fabrics and exterior paint colors of today's cars. These are just a few examples. For further information on HYPALON, just mail the coupon.



MOLDED spark-plug boots of HYPALON withstand high temperatures, are unaffected by ozone.

## NEOPRENE flexible couplings in seat adjustor last well over 30,000 cycles



FRONT-SEAT ADJUSTOR propels seat with force of 1,200 lbs. Jackscrew is driven by 80 inch-ounce motor through neoprene coupling and worm gear.

### Neoprene chosen for resilience, resistance to oil

The auto company that uses this seat adjustor has a test requirement of 30,000 cycles, operating a standard seat loaded with 450 lbs. When the unit was first designed, the manufacturer used a barrel spring for the coupling. It proved to be too noisy and barely lasted through 10,000 cycles before it failed.

The solution to the problem was the flexible coupling shown above. It consists of two flat metal inserts molded into a neoprene disk. One insert engages the worm shaft; the other engages a slot in the end of the motor shaft. Neoprene was chosen as the elastomer for the coupling because its resilience assured a quiet operation of

the adjustor, and its superior oil resistance guaranteed long life to the coupling. The coupling is subjected to occasional contact with oil coming from the worm shaft.

### NEOPRENE couplings outlast metal seat

The auto company's test engineer says he can't recall a neoprene coupling ever failing to pass 30,000 cycles. "In fact," he says, "in tests run to destruction, the coupling was still going strong when the seat itself was completely shot!"

This is just one example of neoprene's proven performance. Its resistance to oil, heat, weather and sunlight has led to its use in many other automotive applications. For more information on design problems solved through the use of neoprene, mail the coupon below.



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E. I. du Pont de Nemours & Co. (Inc.)

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Please send further literature and add my name to the mailing list for your free publications, the "Neoprene Notebook" and "Facts about HYPALON®," which show how the Du Pont elastomers are used in designing new products, improving old.

E. I. du Pont de Nemours & Co. (Inc.)  
Elastomers Division, Dept. AI-9  
Wilmington 98, Delaware

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# AUTOMATION NEWS REPORT

AUTOMATIC CONTROLS  
PRODUCTION — VEHICLES — AIRCRAFT

By Samuel Cummings

## MINIATURE MEMORY

An inch-square "honeycomb" that will store up nearly a million bits of information has been designed by Dr. Harold R. Day of the General Electric Laboratory in Schenectady, N. Y. This new information storage tube, according to Dr. Day, opens up the possibility of much smaller computers with much larger memories.

At the heart of the tube is a thin sheet of glass in which small holes have been etched and then filled with metal. In practice, information is written onto one side of the honeycomb by an electron-beam scanning method similar to that used in television. A "reading gun" picks up information from the opposite side.

Since the holes in the honeycomb are spaced 500 to the inch (a square inch thus has 250,000 individual storage cells), Dr. Day had to contend with the problems of leaking and smearing that frequently plague research engineers when storage cells are placed so close together. In the new tube, each storage cell remembers by building up a charge in the capacitance between the recessed metal plugs and the conducting layers deposited on both surfaces of the glass. The glass honeycomb itself acts as an insulator between the plugs and the surface layers—and between the plugs themselves.

Early laboratory models have only been able to store information for several minutes, but Dr. Day is confident that the amount of time information can be held will be extended.

## ELECTRONIC DEFENSE

Arma Div. of American Bosch Arma Corp. has developed a defensive weapons system for the B-52 intercontinental H-bomb carrier that is designed mainly around an electronic brain, thus practically eliminating the human element. No more than three seconds elapse from the time the system radar sights the target, and is locked on it, until the guns are aimed for the kill. During this flash of time, the computer is fed complete data on the distance, direction, and speed of the target, and on air tem-

perature and pressure, as well as the speed, altitude, roll, and pitch of its own ship. The computer assimilates all this information as well as many other factors which are constantly changing, computes the fire control problem, trains the guns on the target, and sends a signal to the gunner at the proper moment to open fire.

The system not only knows where the enemy fighter is at every instant, but also where it is going to be a few seconds hence; and it knows all these things in a fraction of the time that would be required for a battalion of mathematicians to make similar calculations.

Despite the fact that it includes a number of subsystems—radar, pneumatic, hydraulic, optical, computing, control, and gun feed—the entire defensive system of the B-52 weighs comparably less than the manual defensive armament of the smaller B-17 or B-24 bombers. The system, which is now operational on the B-52, is in volume production at the Arma plant in Garden City, N. Y.

## COMPUTER SYMPOSIUM

The third Computer Applications Symposium, which is sponsored annually by Armour Research Foundation of Illinois Institute of Technology, will be held Oct. 9 and 10 at the Morrison Hotel in Chicago. The two-day meeting will feature 12 speakers who will discuss the use of medium-scale machines, including the IBM 650, Datatron, and others. The first day's sessions will cover business and management applications; the following day will be devoted to engineering and research applications. For further information write to J. J. Kowal, Conference Secretary, Armour Research Foundation of Illinois Institute of Technology, 10 W. 35th St., Chicago 16.

## WHAT PRICE AUTOMATION?

The most urgent question confronting manufacturers and product designers in connection with automation is not whether a process can be automated, but whether it will pay.

At a recent conference of the American Society of Mechanical Engineers, at Worcester, Mass., R. G. Dexter of Barkley & Dexter, Inc., bravely attempted to provide a scientific answer. Specifically, he outlined two methods for estimating the cost of automating assembly operations, which he then wrapped up in two neat formulas. Both methods, he contends, eliminate the guesswork that has gone into previous estimating methods. Incidentally, he claims that his formulas are particularly applicable to automotive final assembly, which, he points out, is not as automated as some people think. Both methods (formulas) are based on two fairly obvious propositions. Item: the overall cost of a development will vary very nearly directly with the total number of detail drawings plus the number of manufactured parts in the proposed equipment. Thus:

(Turn to page 189, please)



When operating conditions demand  
the ultimate in strength, resistance to  
breakage and wear

# SPECIFY PERFECT CIRCLE

CHROME-PLATED **STEEL** COMPRESSION  
RINGS

Why settle for a substitute for the strength  
and flexibility of steel and the proved wear-  
resistance of solid chrome? You get BOTH  
essential qualities when you specify Perfect  
Circle chrome-plated steel compression  
rings.

No other rings give such resistance against  
breakage and wear—plus these vital fea-  
tures: higher unit pressure, conformability,  
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**PERFECT CIRCLE**  
**piston rings**  
*the Standard of Comparison*

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# ON OUR WASHINGTON WIRE



Government for the next two years will continue to exercise its powers to promote defense production, allocate scarce materials,

and regulate exports. Congress has extended the Defense Production Act and the Export Control Act for another two years.

## ULTRASONIC METAL CLEANING—BETTER, AT LESS COST!

# Ransohoff

**automatic  
indexing double  
monorail  
conveyor**  
with Bendix-perfected  
**ultrasonic unit**

See it in operation  
at the METAL SHOW,  
**BOOTH 2734**,  
Cleveland, Ohio,  
October 8-12

"Scrub with Sound"  
saves time,  
space and money

- Wash • Rinse
- Ultrasonic Cleaning
- Rinse • Dry

Combining an ingenious conveyor design with proven Bendix ultrasonics, the Ransohoff Conveyorized Ultrasonic System puts "impossible" cleaning jobs on an entirely automatic basis!

No part is too difficult to clean economically . . . regardless of blind holes and difficult recesses encountered in castings, engine parts, valve bodies. No part is too fragile

for the thorough cleaning performed by this machine.

This 5-stage ultrasonic machine does a complete cleaning job, does it fast and automatically. Operations include: wash, rinse, ultrasonic cleaning, rinse and dry.

For complete details on Ransohoff ultrasonic cleaning systems and other equipment, write **Ransohoff, Inc., 680 North Fifth St., Hamilton, O.**

Still under development by Internal Revenue Service in August were proposed regulations governing payment of the new use tax on vehicles with a gross taxable weight of more than 26,000 lb. Rules covering this tax were given a higher priority than those affecting other taxes levied or increased because of the new road-building law.

There is much in the appearance of current economic conditions that convinces Government officials of the excellence of business prospects for the next three to six months. Business strength and continued high employment are predicted by the Administration.

Industrial marketing executives can count on a bumper crop of fresh and useful new Government statistics between now and next June 30. A tally of the various statistical studies recently authorized by Congress shows that Uncle Sam will spend a whopping \$35 million for production of facts and figures in the 13-month period starting last July 1.

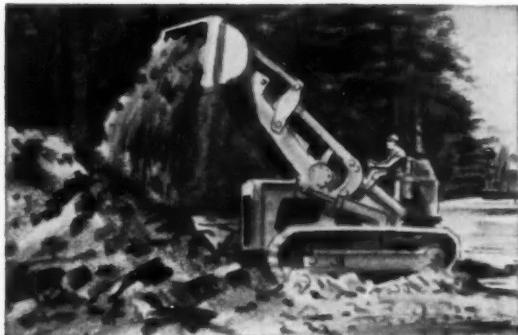
Legal basis for defense of the automobile dealer who becomes involved in a disagreement with a car manufacturer over franchise terms is guaranteed by the new "day in court" law. The Administration, however, is said to feel that some very serious legal problems may be created by the new law.

Securities and Exchange Commission is easing its registration requirements to exempt non-profit companies organized to develop atomic power. It applies to projects primarily engaged in research and development and does not pertain to power companies, generating facilities.

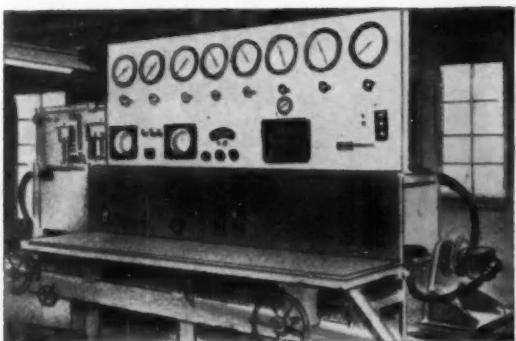
# Ransohoff

An old name... the newest ideas

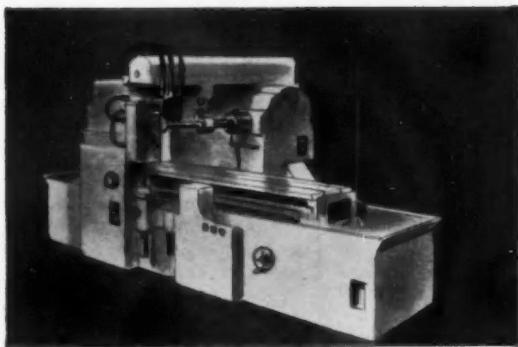
# How hydraulic systems are simplified with 2000 psi vane pumps



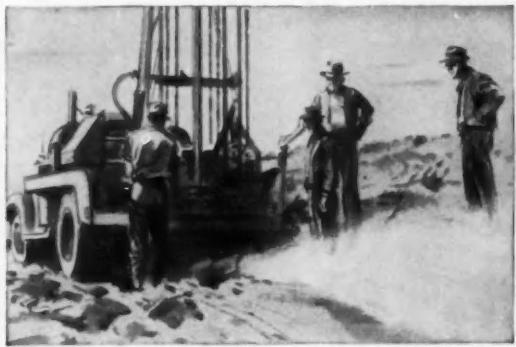
**Lower weight** on mobile equipment with smaller size lines, smaller controls.



**Lower cost** for test stands which require pressures up to 2000 psi.



**Less space** to pack more power with smaller size cylinders and valves on hydraulic machines.



**Higher torque, higher horsepower per GPM** — continuously on drilling equipment.



Exclusive balanced vane  
cuts wear, increases volumetric efficiency, reduces pulsations.

**DENISON**  
*HydroOILics*

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## Vane-Type DENISON hydraulic, single stage pump/motor

INDUSTRY'S STANDARD FOR CONTINUOUS 2000 PSI SERVICE

Many types of hydraulic circuits are made simpler with the 2000 psi system using the Denison vane pump. Less space is needed, weight of pumps and controls is lower. Line loss inefficiency is greatly reduced because of the lower volumes required with a 2000 psi circuit.

As a pump, this Denison unit has high volume output at 2000 psi continuous delivery. As a motor, it delivers a high stalled torque . . . up to 257 inch-pounds per 1000 psi.

Write for Bulletin P-5-A for complete specifications on 4 sizes available for delivery up to 77 gpm as a pump and 1 to 103 hp as a motor.

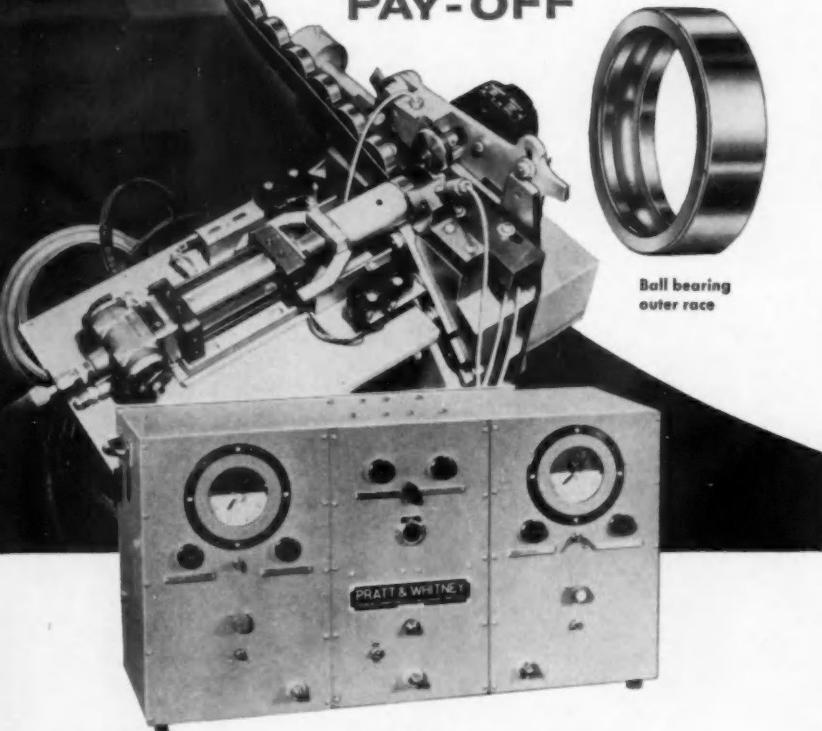
**DENISON ENGINEERING DIVISION**

American Brake Shoe Co.

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to RACES...

...Here's an  
**AUTOMATIC 3-to-1**  
FAVORITE for a  
**BIG**  
**PAY-OFF**



Ball bearing  
outer race

## PRATT & WHITNEY AUTOMATIC GAGING

If you're looking for the best bet in Quality Control, you can really "chute" the works on this outstanding new performer. Pratt & Whitney "In-the-chute type" Automatic Gages can handle the output of several high speed automatic machines.

Races fed by chute into the gage unit are checked for 3 dimensions at 1 time — size and taper and out-of-round at a rate of 2200 pieces per hour and automatically sorted into ok, undersize and oversize categories. If limits are exceeded, the Gage Unit automatically signals that a machine correction is required.

**DON'T GET LEFT AT THE POST...** in the industry-wide race to produce better and faster at lower cost. Learn now how P&W Automatic and Automation Gaging can put you out ahead of the field. Phone the P&W Branch Office near you and ask a Pratt & Whitney Gage Specialist to call ... or write direct to West Hartford outlining your needs.



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MACHINE TOOLS • GAGES • CUTTING TOOLS

## SHORTIES

Aluminum is the most plentiful non-ferrous metal in the world. It represents one-eighth of the earth's crust, but much of it is intricately concealed.

In its pure state, aluminum has a tensile strength of about 12,000 psi. Heat treated alloys have been developed with tensile strengths ranging up to 80,000 psi.

Aluminum can be rolled into foil so thin that 5000 sheets would be needed to make up the thickness of one in.

To give some examples of the extent of the automotive field, one U. S. business in six in automotive; and, in 1955, automotive retailer sales were \$50 billion.

Six years ago there were but 80,000 field forage harvesters on the nation's farms. Today, there are better than 200,000 of these units.

Gasoline consumption in 1954 (latest available figure) was 44 billion gal. This is enough gas to fill a ditch from New York to San Francisco 25 ft wide and 15 ft deep.

Basic air fares today are three per cent higher—dollar-for-dollar—than they were in 1938, as contrasted with 90 per cent increase in overall living costs.

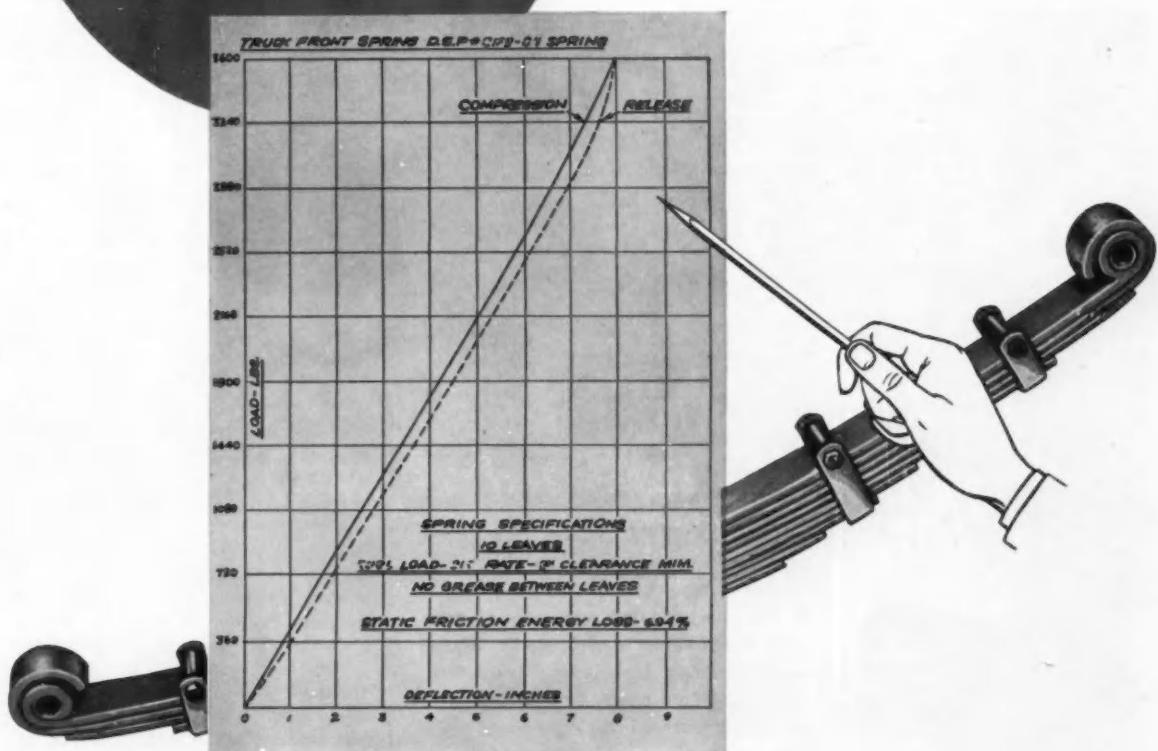
Gasolines are "made to order" with the addition of about \$291 million worth of chemicals each year.

For the last 20 years, domestic oil production has increased an average of almost five per cent per year.

Last year, consumers used six billion gal of liquefied petroleum gas, chalking up a 17 per cent increase from the year before.

# DSP

*Leaf* SPRINGS  
HAVE BUILT-IN  
SHOCK  
ABSORBERS



Specifications for DSP Leaf Springs include "built-in" shock absorber characteristics which ...

Function within a predetermined pattern of performance throughout the life of the spring.

DSP Leaf Springs also include other "built-in" features: load balance control; self alignment of springs, frame, and axles; sidesway control; and transmission of power to the load.

And the PLUS FACTOR of *utmost economy* for both manufacturer and customer.

DETROIT STEEL  
PRODUCTS DIVISION

OF Fenestra INCORPORATED

1500 Tremont Avenue, Detroit 11, Michigan



SINCE 1904—ORIGINAL EQUIPMENT ON CARS, TRUCKS, CABS, BUSES, TRAILERS

## Slower Speeds at Le Mans Race

(Continued from page 170)

the circuit is estimated at approximately \$1 million.

In order to prevent disguised racing cars from taking part in the race, entirely new regulations were adopted and as these will be generalized for 1957 by the International body, the F.I.A. sports cars should now resemble the more conventional of two-passenger competition cars available for the public. Two genuine doors, a

full-width windshield without a metal panel covering the second seat, and an accessible spare wheel must be tired. Fuel consumption is now limited to provide 8.7 mpg by limiting gasoline tank capacity to 34 gallons with refueling allowed after each every 283 miles only. Cars built in limited quantity only, which are called prototypes, must not have an engine with piston displacement of more

than 152 cu in. (2500 cc). The winning Jaguar was eligible, though as over 100 of the D-type competition car has been made. New models were developed for the race by Aston-Martin and Ferrari, but the limitations imposed on gasoline consumption (no racing fuel is allowed at Le Mans) prevented them from approaching the speed of the Jaguar cars. As can be seen from the results, this year's race was won at a lower average than the 1955 event (105.81 mph). In fact, the maximum speed down the long Mulsanne straight dropped from 180 mph to approximately 150 mph on account of the leaner carburetor settings, the higher rear axle ratios and the added drag caused by the more elaborate bodies.

Two of the official Jaguars were fitted with the Lucas gasoline injection system. The one which finished, Hawthorn's car, was often at the pits until engine trouble was correctly diagnosed as a cracked fuel pipe. However, the injection cars were at least as fast as the more nearly standard models with three two barrel Weber carburetors. The Lucas fuel injection system, it will be recalled, has a main pressure pump separated from the metering device. As in a Diesel engine, fuel is circulated continuously by a special pump, all surplus fuel being fed back to the tank. The distributing meter has the form of a rotating sleeve which is driven off the front timing chain idler sprocket at camshaft speed. The hollow sleeve has one port per cylinder. The quantity of fuel is determined according to manifold pressure, which governs the position of an air piston limiting the travel of the metering piston which in turn uncovers the ports according to requirements. Barometric conditions and ambient temperature are compensated for by an external adjustment. Instead of a conventional throttle, a sliding plate with six holes is used for admitting air into the cylinders. One hole per cylinder is provided, and in the open position no obstruction is offered to the air flow. In its present form the Jaguar competition engine is said to develop approximately 285 bhp at near to 6000 rpm.

A new version of the Porsche RS 1500 with a closed body was used for the first time. This has a 138 hp engine of horizontally-opposed design which retains its aircooling and four camshafts. Two distributors are driven off the crankshaft instead of the rear ends of the inlet camshafts. Two spark plugs are fitted per cylinder.

LIKE A  
45" AUTOMATIC  
this NEW INDEX 45 MILL  
has the "CALIBER" and ACCURACY  
to do your  
MILLING, DRILLING  
and BORING JOBS  
.. BETTER, FASTER AND  
MORE ECONOMICALLY!

A FULL RANGE OF OTHER MODELS.

The big caliber derives from the sliding overarm—The unique square design of this overarm gives much more rigidity with its resultant greater accuracy—It provides extra range and capacity—More usable working space—More versatility in set-up—More power at the cutter. No adjustment required on overarm and head after use, and no need to re-indicate head after moving overarm. Speed range with 9 changes makes possible the use of high speed or carbide tipped cutters to the best advantage. Many other important features.

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**Index Machine Co.**  
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# QUIET

as a gentle breeze!



MODEL  
7500-B



## New **ARO** **DULCETONE SCREWDRIVER**

**"Whispers while it works"**

Reduce noise to a whisper in your assembly operations . . . cut down operator fatigue . . . use ARO Dulcetone Air Screwdrivers! This slim compact tool runs with a *quiet gentle* exhaust. Light weight . . . 1800 r.p.m. Capacity No. 8 nuts and machine screws. Dulcetone Screwdrivers now offered as standard tools . . . immediate delivery. Ask your ARO Distributor for a demonstration.

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Also...Air Hoists...Lubricating  
Equipment...Aircraft Products  
...Grease Fittings

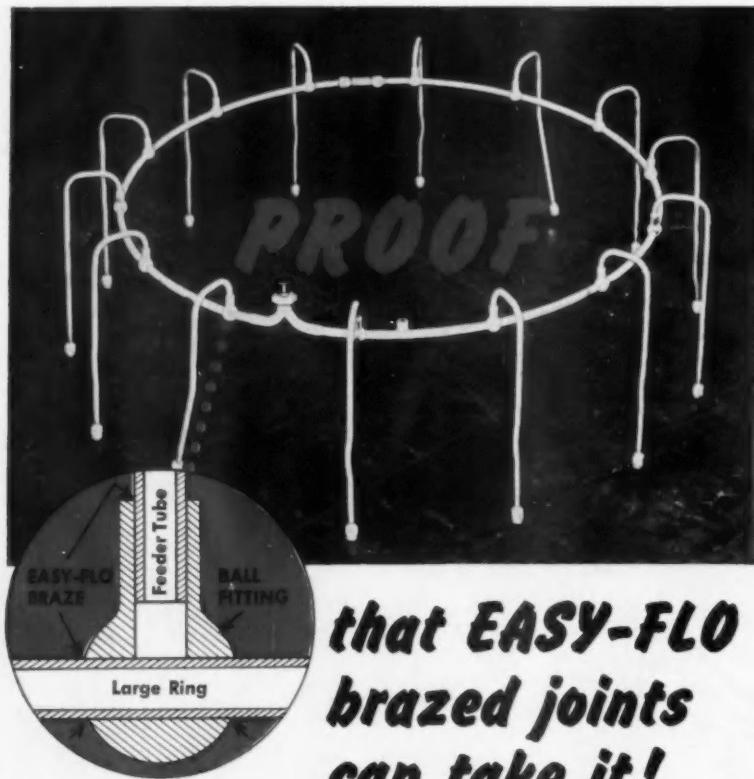


Photo courtesy of  
TUBE PROCESSING CO.  
Indianapolis, Ind.

## that EASY-FLO brazed joints can take it!



### WHY HANDY FLUX?

To reap full benefit and economy of EASY-FLO's low flow point of 1175°F, HANDY FLUX is a "must". That's because it works at 1100°F. But equally important, HANDY FLUX is unsurpassed in performing a flux's main function of dissolving and absorbing oxides. In paste form, it is easy to apply and stays put. TRY IT.



Above you see a stainless steel fuel line assembly for jet engines. As such, it has to stand the stresses and strains of severe vibration, mechanical shock and temperature changes. That it does stand them, simply adds more proof of the already well established fact that the low-temperature silver brazing alloy EASY-FLO consistently makes high-strength, leak-tight, virtually indestructible joints.

### ALL 48 EASY-FLO JOINTS PROVE IT

Sketch shows how ball fittings are brazed to large ring, and feeder lines into ball fittings. Also brazed are the end fitting on feeders, the connecting fittings and small fittings on the ring—a total of 48 EASY-FLO joints. Before brazing, all joint areas are covered with HANDY FLUX.

### GET THE FULL EASY-FLO STORY IN BULLETIN 20

This 24 page bulletin tells why EASY-FLO makes joints that equal the parent metals in strength, leak-tightness and durability—and why EASY-FLO brazing is tops for speed and economy. It also tells about HANDY FLUX. Write for a copy today. With it we'll send a copy of our "Distributor List".



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MONTREAL, CANADA

der, and for each pair of cylinders there is one two barrel Weber carburetor. This is probably the most efficient aircooled engine built for competition cars so far. A five-speed Porsche transmission has supplanted the former four-speed version. The new chassis uses a rear swing axle with separate swing arms under the drive shafts.

The new Ferrari cars built for Le Mans have four cylinder engines developing, in their 152 cu in. version, up to 215 bhp. They did not prove sufficiently fast for challenging the Jaguars, however, probably on account of their economical engine and carburetor settings. The transmission is mounted at the rear end of the engine block, and the De Dion rear end has been discarded in favor of the more conventional rigid rear axle with longitudinal leaf springs.

Very good results have been attained by two representatives of the relatively recent British makes, Cooper and Lotus. These cars use the Coventry Climax engine and have very light frames. The Cooper carries the engine at rear.

Disappointing performances were put up by the two French makes, Talbot and Gordini. The Talbot cars were fitted with a 2½ litre Maserati engine, but the chassis proved relatively heavy, and both cars were beset with troubles. The Gordinis all dropped out for reasons.

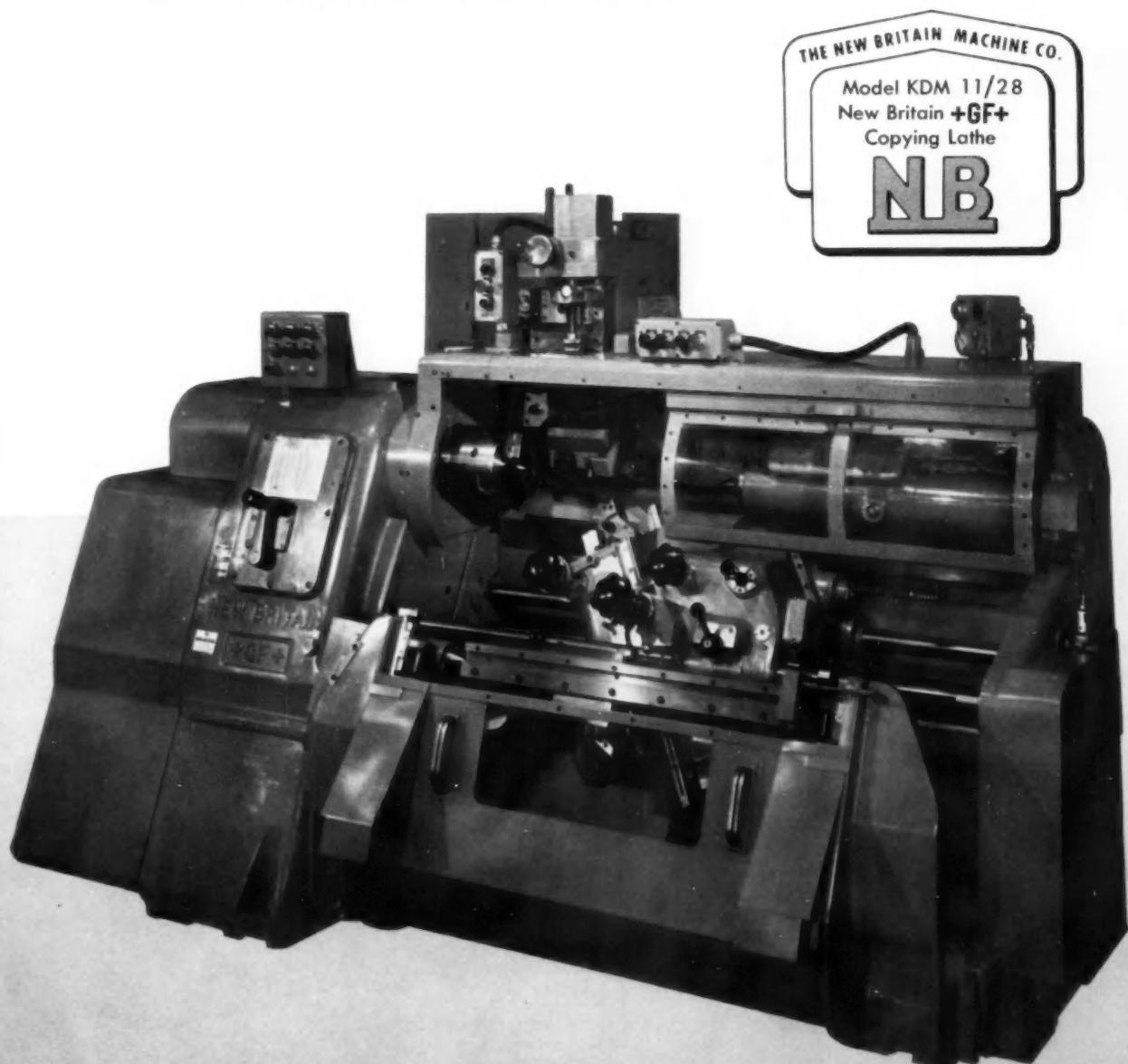
Once more the special classification according to a formula taking speed versus cubic capacity into account was won by a DB Panhard with an engine developed from the flat-twin used in the passenger car of the Panhard firm.

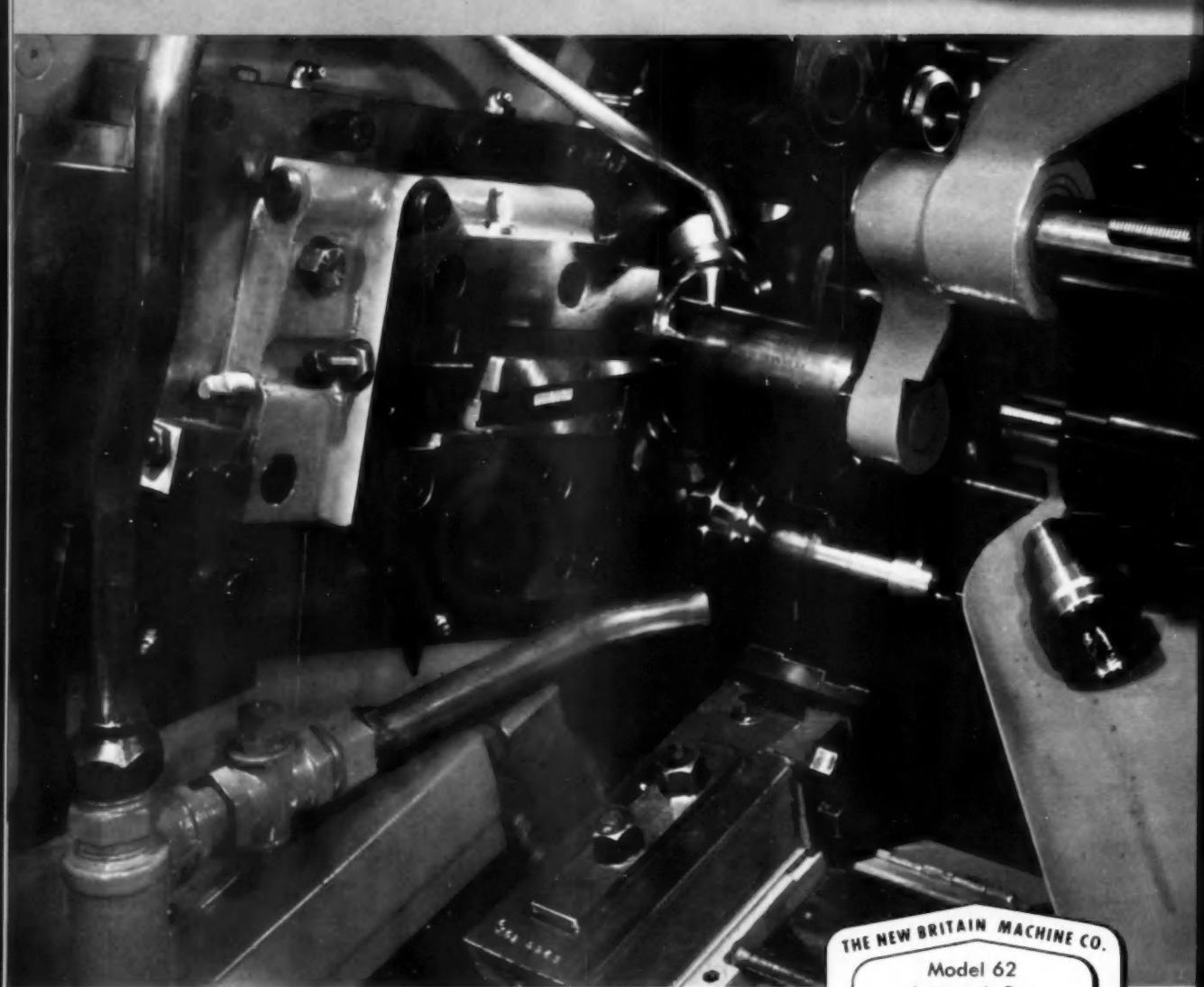
## BOOKS ...

AUTOMOTIVE BRAKES AND POWER TRANSMISSION SYSTEMS, by I. Frazer, W. Billiet, and P. V. Eshelman, published by American Technical Society, 818 First 58th St., Chicago 37, Ill. Price, \$6.95. This is much more than a service manual, because it not only tells the mechanic how to repair a particular unit but it provides the basic automotive facts that enable him to make his own diagnosis. The authors, both prominent in the automotive and industrial training fields, have restricted the text to brake and transmission systems operation, maintenance, and repair. Their coverage is comprehensive: they have provided trouble shooting and repair procedures for all types of brakes and transmission systems—manual, air, vacuum and electric brakes, torque converters, fluid coupling, overdrives, and various automatic transmissions. The text is clearly written and well illustrated.

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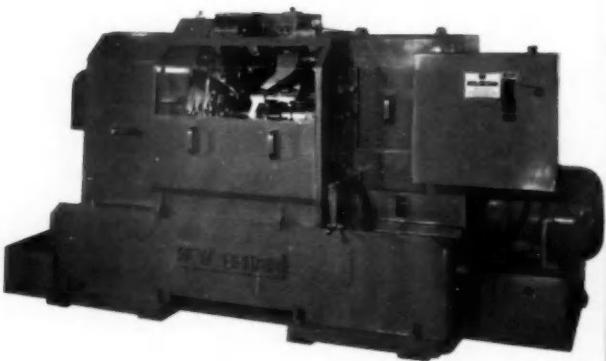
THE NEW BRITAIN MACHINE CO.

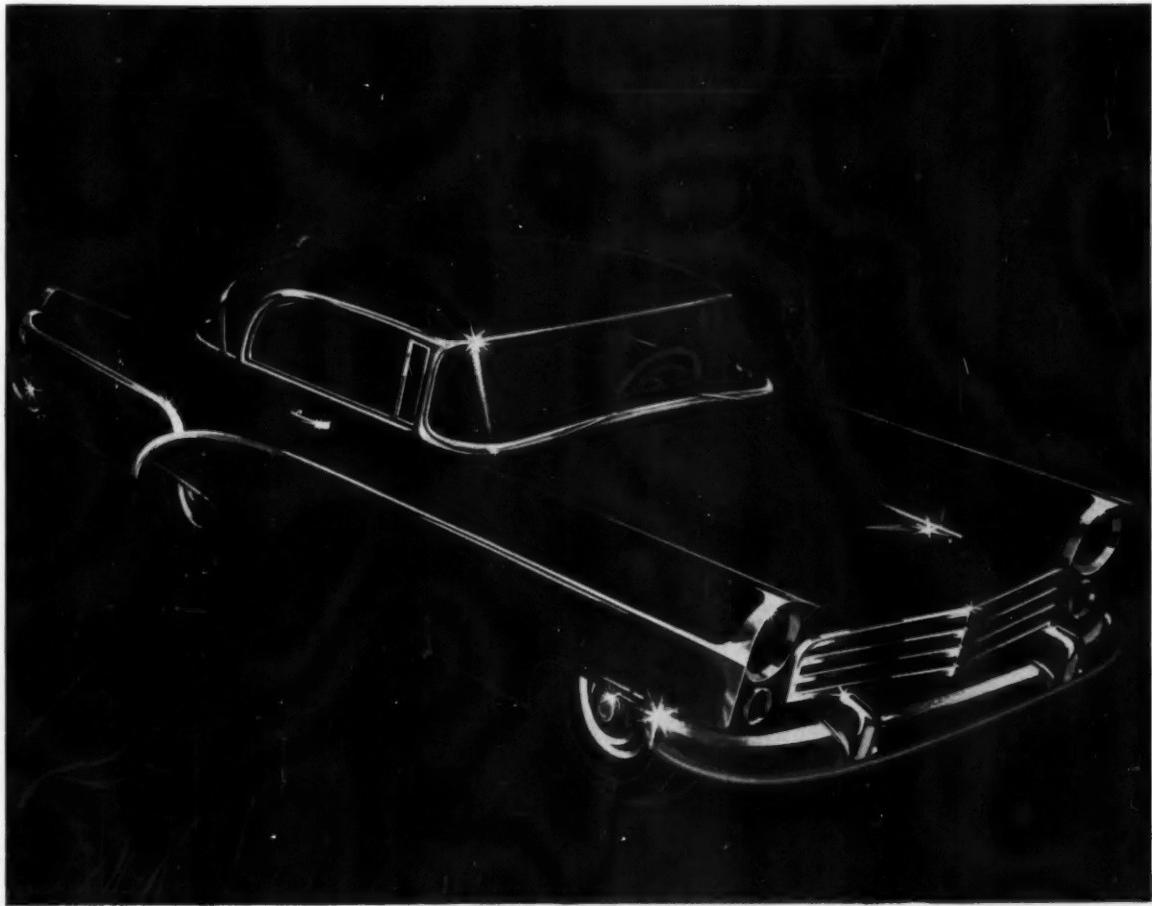
Model 62  
Automatic Bar  
Machine

**NB**

**a rugged cross slide  
in every position**

New Britain Models 60 and 61 Automatic Bar Machines are everywhere you turn. The new Model 62 represents new progress in rugged construction and versatility of setup. Your New Britain Representative can show you how to modernize at a profit. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.





Usable beauty for exacting service...

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Strong, practical, durable...easy to clean and keep clean...that's stainless steel.

Air, water, fumes, road dirt and chemicals don't affect it. And the beauty is clear through—not skin deep. Stainless never peels, flakes or grows permanently dingy. Its luster lasts a lifetime. Its brilliance can be restored with ordinary cleaning. And the harshest cleaners can't harm it. Stainless steel does not easily dent or gouge

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Truly stainless steel is a metal of sterling qualities. It belongs on all fine cars wherever economy and ease of fabrication are a prime consideration...styling and elegance are desired.

Your supplier has the particulars. Contact him today. And remember:

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## He had 4 wiper cuts last month



They're easy to distribute . . .



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Always a clean one handy . . .



Just toss 'em in the trash . . .



Chips can't hide in a clean Scott Wiper. Each Wiper is brand new, fresh from the carton. A man takes a Scott Wiper as he needs it . . . uses it for his face, his hands, his product.

## ...He had none!

## *The difference is... Scott Wipers*

This is sanitary wiping. A man uses a Scott Wiper thoroughly, throws it away—takes a new one. No danger of cuts from hidden chips . . . no fear of skin infection from dirty wipers . . . when you take a fresh wiper from the carton.

And because Scott Wipers are disposable you save in many other ways. Sorting and baling are elimi-

nated. Handling and distribution are simplified. Laundering becomes a thing of the past.

Your local Scott representative or distributor is ready to demonstrate in your plant any time you say. Call him or mail this coupon right away.

*Another quality product of . . .*  
**SCOTT PAPER COMPANY**

Scott Paper Company  
Dept. W-5, Chester, Pa.

Please send me more  
information about  
Scott "Throw Away" Wipers.

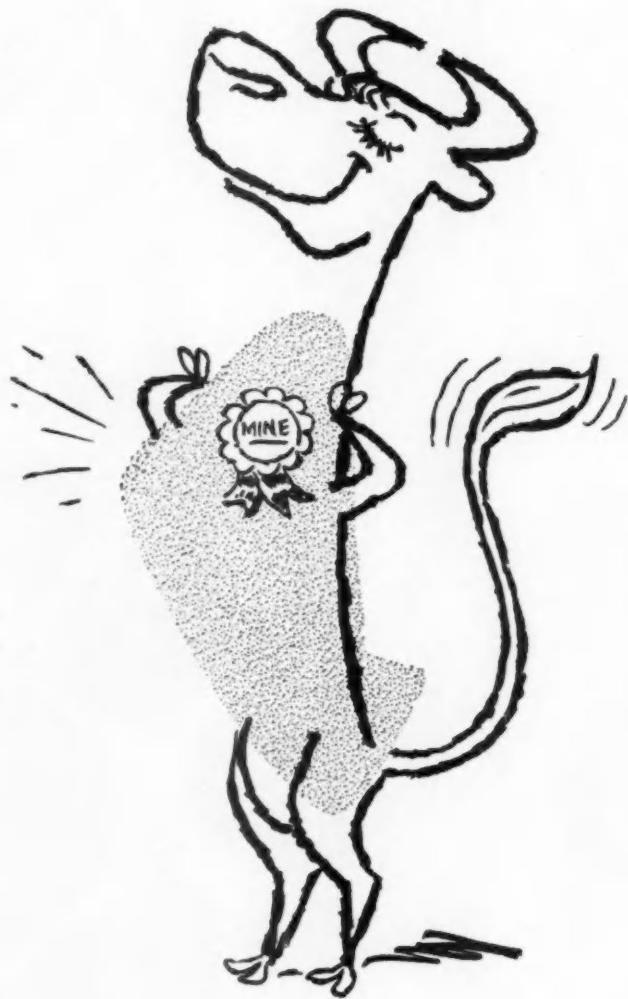
Name \_\_\_\_\_

Company \_\_\_\_\_

Position \_\_\_\_\_

Address \_\_\_\_\_

**Another Manufacturer Chooses 95 Central**



## For pride of ownership

<sup>genuine</sup> Leather

You give—yes, give—your customers a very real  
and important extra, when you sell them a car upholstered  
in genuine leather. Genuine leather upholstery has about it  
an air of excellence, a feeling of quality, that can't be matched. There's no extra  
charge for the pride they feel in having so much beauty and so much value.

*Only genuine leather wears as well as it looks*

THE UPHOLSTERY LEATHER GROUP, INC. • 99 West Bethune, Detroit 2, Mich. • 141 E. 44th Street, New York 17, N.Y.

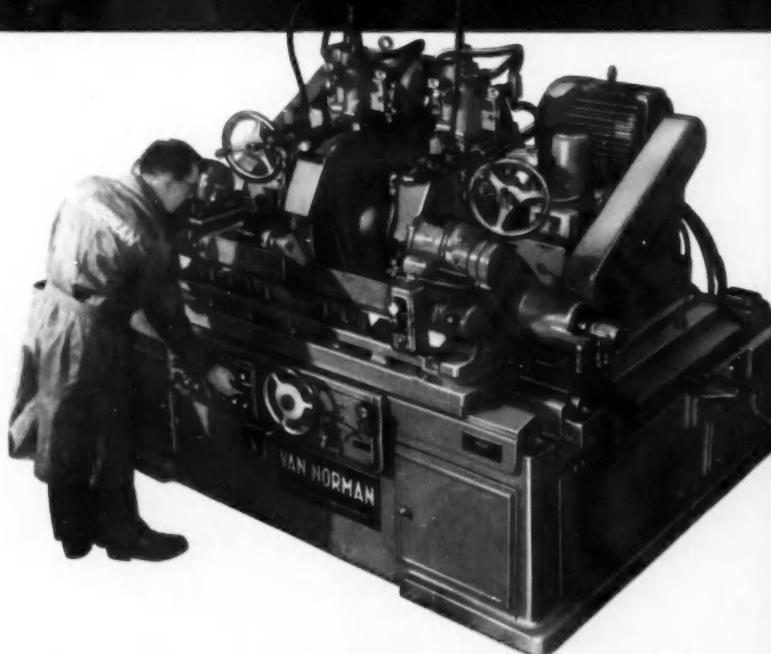


## Another Manufacturer Chooses G-E Control For Automotive Industry Machines



This General Electric factory-built panel provides accurate, reliable control for a new Bowgage Production Grinder, manufactured by the Van Norman Co., of Springfield, Mass. The panel incorporates standard, high-quality G-E starters, relays, switches, and other devices for such functions as interlocking, sequencing, and counting for the automatic dressing cycle.

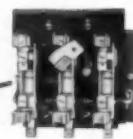
The control panel circuitry is designed so that this high-production Van Norman machine can grind any automotive part that can be readily clucked. The grinder can remove 0.022 inches on a 1½-inch diameter piece, and with operator-initiated automatic clamping can have a new piece ready for grinding every 15 seconds—while holding a 15 micro-inch finish.



**GENERAL** **ELECTRIC**

G-E panels for machines like this meet JIC specifications. For some of the devices used in General Electric automotive panels, see the next page.

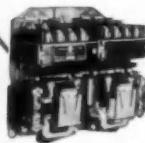




**FUSED DISCONNECT SWITCH** — double-break contacts easily visible for inspection—poles can be replaced individually—kits available for changing fuse clips to accommodate other current ratings and voltages.



**MAGNETIC STARTER** — completely inspected and serviced from the front—easy-to-change heavy silver contacts—exclusive Strongbox coil protected against oil, dust, and accidental damage.



**REVERSING STARTER** — in addition to the mechanical interlock which prevents forward and reverse contactors from closing at the same time, electrical interlocking can be supplied when specified at no extra cost.



**LATCHED-IN RELAY** — main and latch coils both have Strongbox construction for long coil life, greater dependability.



**MACHINE TOOL RELAY** — contacts easily changed from normally open to normally closed—front-connected saddle-clamp terminals make wiring easier—high dependability and easy servicing reduce maintenance—spring attached to movable contacts facilitates installing or removing contacts, assures proper tip pressure.

## G-E CONTROL for the Automotive Industry

In addition to those shown above, G-E devices include:



**STRONGBOX SOLENOIDS** with coils molded in polyester resin for longer life, better protection against dust, water, and oil.



**OIL-TIGHT PUSH BUTTONS** with self-a-line contacts that increase life 2:1—proved by actual load tests.



**PNEUMATIC TIME-DELAY RELAY** with contacts rated at 25 amps. Wide range of settings from 0.2 to 180 seconds—can be changed to time delay after de-energizing without additional parts—instantaneous interlocks available.



**6-POLE MACHINE TOOL RELAY** has the same mounting dimensions as 4-pole form—wired from four directions—captive, saddle-clamp terminals, accessible from front, make wiring easy—3-slot mounting.

High quality General Electric control helps protect against interrupted operation and unscheduled shutdowns. Designed and constructed for long operating life, G-E devices assure you of the reliable control required by high-production automotive equipment.

The assembly of standard control components into Pan-A-trol\* panels means added dependability for your machines. Also, packaged control in a NEMA 12 enclosure makes inspection and maintenance easier, and helps protect against the entrance of oil, dirt, or moisture.

Be sure you have high quality, dependable control for the machines in your plant. To obtain more information on these G-E devices for the automotive industry, contact your nearest G-E Apparatus Sales Office or Distributor, or write Section 733-14, General Electric Company, Bloomington, Illinois, for GEA-6317, **CONTROL FOR JIC APPLICATIONS**.

\* Trade mark, General Electric Company

*Progress Is Our Most Important Product*

**GENERAL ELECTRIC**



## AUTOMATION NEWS REPORT

(Continued from page 172)

Total cost = (number of details + number of manufactured parts) C, where C is a constant representing the measure of efficiency and wage scale of the development organization, which can only be determined by past experience.

Item: the cost of final equipment will be the summation of the costs estimated for each operation; and the cost for each operation will vary linearly and proportionately with: (a) the difficulty of operation; (b) nature of the product handled; (c) speed of operation; (d) adjustability required; (e) increase or decrease in overall size of equipment, compared with average size of past equipment. Thus, if

O = operation factor (where simple indexing = 1)

P = product factor (where uniform rigid block = 1)

V = speed factor (where 30/min = 1)

A = adjustability factor (where no adjustment = 1)

S = size factor (where average past experience = 1)

Then

Total cost of equipment =  $(O_1 P_1 V_1 A_1 S_1) + (O_2 P_2 V_2 A_2 S_2) + \dots + C$ , where C is a constant.

The upper limits of O, P, V, A, and S, Mr. Dexter explains, are straight line functions, and must be established from past experience; this is also true of the constant C.

### AUTOMATION TOOL PLANT

Automation has been a boon to many manufacturers of special tools, which are generally required for automated lines in plants. The demand for such special tools has encouraged tool makers to expand their facilities for producing them. One firm, the Wesson Multicut Co., has announced that it will construct a new plant in Brighton, Mich., for the exclusive manufacture of special tools used by automated industries. It will be the fourth new facility to be constructed by Wesson in the past two years.

**AUTOMOTIVE INDUSTRIES . . .**  
Is your News Magazine of Automotive and Aviation MANUFACTURING

### REPORT ON RUSSIA

Soviet scientists are working at full speed on automation in their research and development institutes, according to a report presented by Weldon H. Brandt at the semi-annual meeting of the American Society of Mechanical Engineers in June.

Dr. Brandt, who is manager of the Director Systems Department of

Westinghouse Electric Corp., was one of three men selected recently by ASME, at the request of the State Department, to make a two-week tour of Russian factories and other installations. Also serving on the team were Nevin L. Bean, of Ford Motor Co., and Albert C. Hall, of Bendix Aviation Corp.

The American team found that extensive programs have been set up for studying telemetering or information handling as it may affect industrial processes; and for studying machine control systems, including hy-

I Unit...  
3

**Filtration Processes**

- MAGNETIC SEPARATOR
- GRAVITY ATTRACTION
- FILTRATION

**Delpark** **UP-FLO** **MAGNETIC SEPARATOR**  
**AND FILTER**

**...WITH PERMANENT FILTER SCREEN and**  
**3 COMPLETELY AUTOMATIC CLEANING DEVICES**

Combines the new Delpark powerful magnetic separator with a permanent filter media bar stock screen. Swarf bearing liquids flow on top of a large flat magnetic field. Magnetic unit incorporates more Alnico #5 magnets, gives twice the width of field, brings all swarf in suspension within the influence of the magnetic field, puts gravity to work in assisting the magnets and prevents washing and turbidity by using low velocity flow. This feature is particularly desirable on high viscosity fluids.

Three cleaning devices, completely automatic, remove the separated residue from the unit. Chain driven flights remove deposits from the magnetic field and the bar stock screen. ".004" bar screen is cleaned

by an air shaker device to dislodge enmeshed particles. A drag-out unit is built into the clean coolant tank.

Up-Flo Filters are available without magnetics for non-ferrous metal applications.

See your Delpark representative for more complete information or write.

**Delpark** **FIRST IN**  
**FILTRATION**  
**ADVANCEMENTS**

**INDUSTRIAL FILTRATION COMPANY** 19 Industrial Avenue  
TERRE HAUTE, INDIANA

THOMSON

# NYLINED\*

BEARINGS



...with Smooth, Tough,  
DuPont NYLON!

#### ...OFFER YOU THESE IMPORTANT BENEFITS

- LOWER COST
- RESIST CORROSION
- NO LUBRICATION
- EASILY INSTALLED
- MINIMUM SPACE
- DAMP VIBRATION
- CLOSE FIT
- OPERATE IN LIQUIDS
- RESIST POUNDOUT
- NO FRICTION OXIDATION
- RESIST ABRASION
- LIGHTEST WEIGHT
- NON-CONTAMINATING
- LESS MAINTENANCE
- SELF-RETAINING
- INSTANTLY REPLACEABLE
- LOW FRICTION • SILENT
- LONGER LIFE

Engineered to Solve Problems...Improve Products...

Reduce Costs!

NYLINED Bearings are a highly engineered thin liner of DuPont Nylon, designed to bring bearing users the many benefits of Nylon as a bearing material by solving most of the limitations surrounding its use. The compensation gap principle assures maintenance of diametral tolerances for precision applications.

Available in 6 standard types, 10 standard sizes...from stock. Other types and sizes may be inexpensively tooled for production applications. For catalog containing data on advantages, applications, standard sizes, prices, special types, load ratings, engineering information, evaluation chart, installation methods ... write to

\*REG U. S. PAT. OFF.



**THOMSON INDUSTRIES, Inc.**

DEPT. I, MANHASSET, NEW YORK

Also—

Manufacturers of BALL BUSHINGS...the Ball Bearing for Linear Motions

draulic, pneumatic and electrical types of control.

The most striking example of automation the team encountered, according to Dr. Brandt, was in ball bearing production. In one plant they visited, race forgings are conveyed automatically from a hopper to chucking lathes, which perform four operations before the work is moved to the next line. Scrap from all the lathes is fed by chute to an underfloor conveyor. All handling to the point of final delivery is completely automatic: gravity conveyors, chain conveyors, and pusher conveyors are used.

The American observers were particularly impressed, Dr. Brandt reported, by intermediate storage points on this line, which provided for balancing production rate and for continuity of operation in case of machine breakdown. Elaborate schedules of tool replacement and adjustment have been worked out, Dr. Brandt believes, in order to avoid the necessity of adjusting tools by feedback.

## BOOKS...

COMPUTERS: THEIR OPERATION AND APPLICATIONS, by E. C. Berkeley and L. Wainwright, published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Price, \$8.00. This practical down-to-earth book covers all the basic elements of digital, analog, and miniature computers, as well as such important aspects of the subject as computer reliability, advantages, limitations and maintenance. A large chapter is devoted to present and potential applications of computing machines in scientific laboratories, government, military installations, and many business markets. Other useful features are: a convenient checklist of computer characteristics; an excellent bibliography; a list of organizations from whom automatic computing equipment may be bought or rented; and a large glossary of terms and expressions used in the automatic computing and allied fields. Altogether a valuable reference book for engineers, physicists and technicians, as well as business and industrial executives who are interested in determining where computers can fit in with their operations and how they can be obtained.

SIGNIFICANCE OF ASTM TESTS FOR PETROLEUM PRODUCTS, published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price, \$2.50. The third edition of this publication outlines the significance of the various tests related to petroleum products, and calls attention to their limitations. Each chapter discusses a particular property or characteristic, covering the importance of sampling, selection of test apparatus, the methods of test which apply, and their significance. The publication is designed to give petroleum executives, scientists, engineers and laboratory technicians a general idea of the performance characteristics of specific products, and the significance of the properties of petroleum products in relation to each other.

# TRUCKING . . . Vital Transportation Link



## Transmission Repairs only .0003c ( $\frac{3}{10}$ mill) per mile at SUPER SERVICE

after an average of 210,176 miles on each of  
172 Fuller Transmissions

"With the Fuller ROADRANGERS in our fleet, we've hit an all-time low in transmission repair costs," says Ray Carter, Director of Engineering for Super Service Motor Freight Co., Nashville, Tennessee.

Super Service recently completed a careful check of maintenance records for 172 White tractors equipped with Fuller 10-speed Semi-Automatic ROADRANGER Transmissions. With an average of 210,176 miles per tractor, company records showed a remarkable average repair cost of *only* .0003c ( $\frac{3}{10}$  of a mill) per mile for

### *each ROADRANGER Transmission!*

About two years ago, Super Service standardized its entire over-the-road fleet on White tractors equipped with ROADRANGER Transmissions and Cummins diesel engines. From that time on, old performance records began to fall.

Operating from the South to the East . . . with terminals from Nashville to New York . . . the ROADRANGER equipped tractors pull square nose, 35-foot aluminum trailers that average 52,500 lbs. gross tare weight. The tractors now cut a

full hour off the old 10-hour trip time on the Nashville-East run . . . taking rugged Tennessee hills at 35 miles an hour when 15 was considered a good speed with the old equipment.

Super Service cuts running time and maintenance to a minimum by running its rigs straight through from Nashville to New York. Drivers are changed twice . . . but there's no need to warm up a cold engine at each stage of the relay.

For your fleet, get the facts on ROADRANGERs from your truck manufacturer or truck dealer now.



FULLER MANUFACTURING COMPANY  
TRANSMISSION DIVISION • KALAMAZOO, MICH.

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.

## MEN in the NEWS

(Continued from page 66)

Food Machinery and Chemical Corp.—Paul L. Davies has been elected chairman and chief executive officer. Ernest Hart becomes president. John D. Crummey was named honorary chairman. New executive vice-presidents include: Dr. Carl F. Prutton, James M. Hait, and John D. Fennebresque. John M. Pope becomes financial vice-president and Alfred T. Leofeller a vice-president.

Firestone Tire & Rubber Co.—Dr. John L. Miller has been named Director of Defense Activities.

Arthur D. Little, Inc.—William A. W. Krebs, Jr., has been elected vice-president.

Minneapolis - Honeywell Regulator Co., Doeclam Div. — George J. Schwartz has become vice-president and general manager.

American Motors Corp.—Wallace S. Berry has been named research director for the automotive division.



Vickers, Inc. — Frank L. Mancher has been named chief engineer for airborne products, and Paul C. Mortenson has become chief engineer for ground mobile products.

International Business Machines Corp.—Harry J. Moore, Jr., has been made director of purchasing.

Kaiser Aluminum & Chemical Corp., Fabrication Div.—H. S. Spaulding has been made general staff metallurgist.

Wagner Brothers, Inc.—Jack Keyes has been elected vice-president in charge of western Michigan sales.

Dodge Manufacturing Corp.—Carlton Shamo has become supervisor of publicity.

Brush Electronics Co.—Leo M. Monroe was made manager of industrial equipment sales.

Cleveland Instrument Co., Inc.—Fred Witzke is now manager of sales engineering.

National Vulcanized Fibre Co.—William W. Janney is now manager of the Export Dept.

Vickers, Inc.—Charles W. Newman is now manager of the Northwest Branch.

Dearborn Marine Engines, Inc.—Merritt A. Mieras has been named vice-president in charge of sales engineering.

Chevrolet Motor Div.—Andrew V. O'Keefe and Alvie L. Smith were named assistant public relations directors.

Consolidated Electrodynamics Corp.—Philias H. Girouard was named assistant director of engineering.

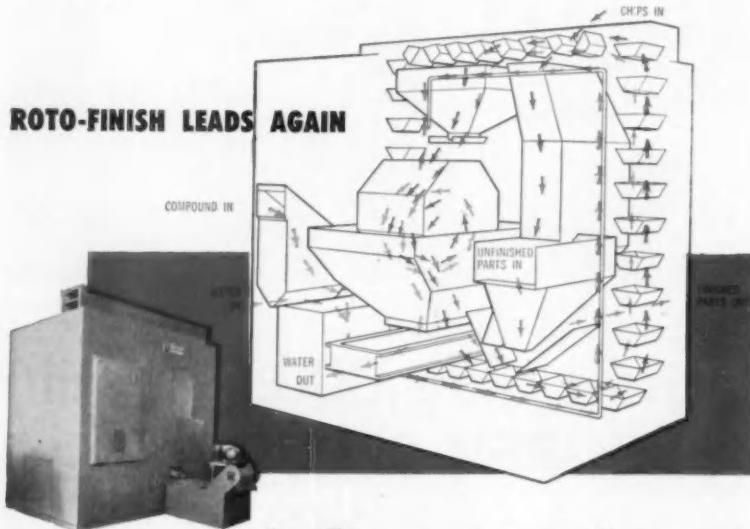
Electric Storage Battery Co.—William C. Faust has been appointed manager of public relations.

General Electric Co.—A. Eugene Schubert has been named manager of Chemical Development Dept.

Shallaway Corp.—Frank De Matteo is now controller and chief accountant.

Massey - Harris - Ferguson, Ltd.—W. E. Phillips has been named chairman and chief executive officer.

### ROTO-FINISH LEADS AGAIN



### the new "Rotomotion" MACHINE MAKES MECHANICAL TUMBLING A FULLY AUTOMATIC BARREL FINISHING PROCESS

- Completely Automatic
- Needs no operator in attendance
- Loads and unloads itself with each cycle.
- Cycle variable for different part requirements.
- Provides continuous operation
- Assures uniformity of finish
- Low cost operation — high production
- Complete package unit
- Simple to install . . . Electric, water, air and drain connections only.
- Suitable for straight line production.
- Thus, "Rotomotion" barrel finishing machine becomes a machine tool.

# Roto-Finish

3713 MILHAM ROAD, KALAMAZOO, MICH.

ORIGINATORS OF THE ROTO-FINISH PROCESS



C O M P A N Y

P. O. Box 988 —  
Phone 3-5578



Photo sequence shows impact cleat burying itself in the tread of a nylon cord tire. Nylon cord tires can take this punishment up to 300,000 times, while ordinary tires will stand only about one-fifth as many blows.

# THERE'S EXTRA SAFETY IN NYLON CORD TIRES

Tires are among the components that can help make today's fine cars even safer. For our roads—whether superhighway or city street—are traveled to a point that tire failure of *any* kind is a potential danger.

- Nylon cord tires offer utmost safety, surest protection against tire trouble. Nylon tires have proved their superiority on military and commercial planes and on heavy-duty trucks. The people whose lives and livelihood depend on the ability of cars to perform at high speeds rely on nylon tires. Turnpike police, professional auto racers and high-speed test drivers are examples.
- Nylon cord tires reduce unsprung weight, and they readily absorb the added strains of power steering, braking, and higher horsepower.
- Nylon cord tires are among the components which contribute importantly to motor-car safety. They are the coming standard of the industry. As original equipment, they provide a valuable sales feature—extra safety.



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

Du Pont produces the nylon fiber.  
Tire manufacturers make nylon cord tires  
—in tubeless or conventional types.

# Observations

By Joseph Geschelin

## Tooling Service

Perhaps not news for people in the Detroit area but of general interest is the fact that a number of the larger machine tool builders are glad to

serve, on occasion, in the capacity of studying the design of a new product, recommending the best machining procedure and tooling. In addition, these companies also can undertake to contract for the development of a complete machine line, including other

makes of machines not produced by them. Not only is this an invaluable service, it is also more dependable and has more know-how than the usual contract service on the part of organizations not associated with the industry.

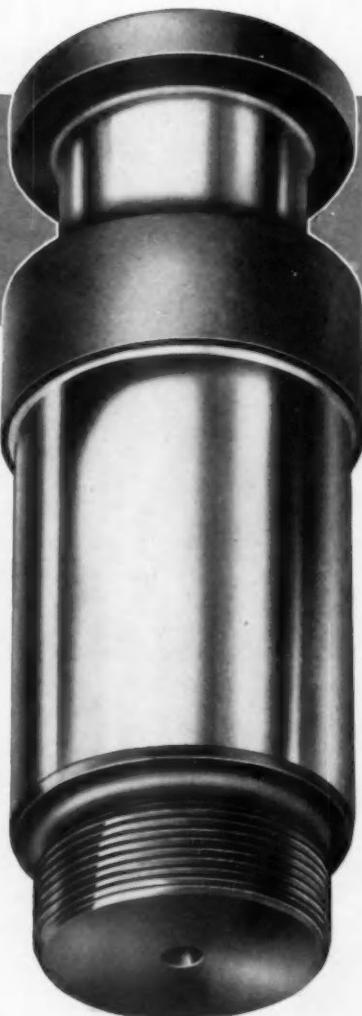
## Hardened and Ground Parts are our Specialty

This king pin is truly king-size: 8" long and weighs about 12 lbs. We machined it out of No. 3140-2½" bar steel. After heat treating, bearing surface was given the specified fine finish-grind to 2½" dia., +.000-.001.

Parts like this are our specialty — we've been making them exclusively for the automobile industry for more than 40 years. Each year has added to our knowledge and skill in precise machining, scientifically-controlled heat treating and micro-finish grinding. Let us show you what we can do with one of your tough jobs. Write or wire.

*Henry W. Brown*  
PRESIDENT

Experienced production on:  
King Pins • Wheel Studs  
Shackle Bolts • Shackle Pins  
Brake Anchor Bolts  
Countershafts • Idler Shafts  
Stub Axle Shafts  
Steering Ball Bolts  
5th-Wheel Rocker Shafts  
Water Pump Shafts  
... anything in the hardened and ground line, of any analysis steel, up to 4½" diameter.



## THE BROWN CORP.

213 BELLEVUE AVE.

SYRACUSE, N. Y.

C. H. Ehlert, 3407 Clarendon Rd., Cleveland • N. F. Spring, 4216 Balfour Rd., Detroit • R. C. Sanderson, 5881 N. Ashland Ave., Chicago • Harry J. Windmiller, 1704 Carlton, Fort Worth • Lyle M. Johnson, 1295 Westwood Blvd., Los Angeles, Calif. • John B. Hunt, 5811 S.E. Yamhill St., Portland, Ore.

## Automated Gearing

1957 production lines will feature several unique gear lines in which small gears, such as planet gears for automatic transmissions, are produced on highly mechanized lines without any operator attention. Automatic inspection stations along the line take care of gaging and gear speeding, supplying a flow of product that is completely acceptable without operator attention. Gear experts recognize this development as having unusual novelty and significance.

## Machine Progress

A recent swing around the machine tool builders plants divulged not only an enormous amount of equipment for motor car plants for 1957 production but an amazing variety of large, specialized machine tools equipped with computers for programming on many jobs for the West Coast aircraft industry. Coming soon will be a heavy duty drilling machine with programming; and a unique multiple-head profiling machine still in the development stages.

## Engine Rebuilders

We did not realize how important the engine rebuilding business has become. Some of the larger companies account for 500 to 1000 engines a month; there may be some who exceed these figures. A rough estimate places this business as being around 200,000 to 300,000 or more engines a year. It constitutes an important market for parts such as piston rings, engine bearings, gaskets, pistons, etc. The larger organizations also are potential customers for specialized machine tools.

(Turn to page 198, please)

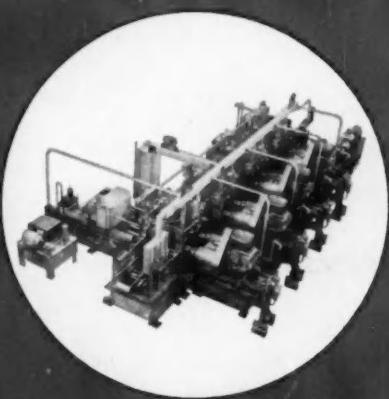
# Another Natco® Shipped on Time

Delivery schedules of capital goods such as large, high-production machines present problems for machine tool builders. At Natco these problems are as serious as with any builder. But Natco's current record for on-time shipment is remarkably good . . . 86% either on schedule or better than schedule.

And we're not stopping there . . . we are adding 50% more production capacity to further improve our delivery schedules.

Production schedules of consumer products also present serious problems. With modern, high-production, cost-saving machine tools, many perplexing production schedules become routine.

Call in a Natco Field Engineer to discuss your next production problem. You can count on his recommendations and his delivery promises.



Natco Holeway® transfer machine turns and faces 120 cylinder blocks per hour.



Multiple spindle drilling, boring, facing and tapping machines.  
Special way-type, index and transfer machines.

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

**NATIONAL AUTOMATIC TOOL COMPANY, INC. Richmond, Indiana**

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan



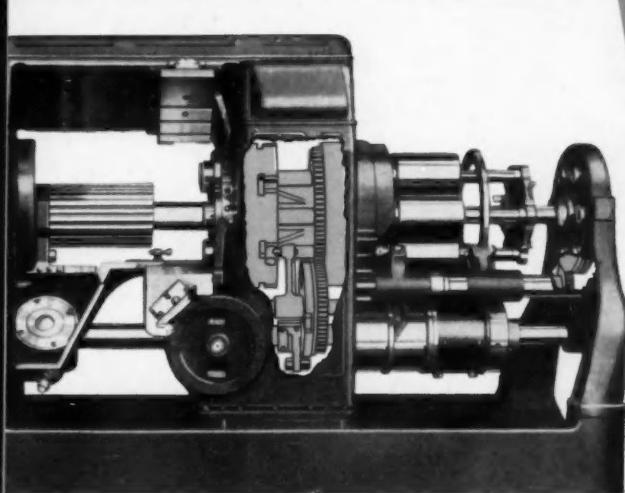
# *Acme-Gridley*

(Left)  
1" RA-6  
Acme-Gridley  
tooled to  
complete  
the piece in a  
single setup—  
including cross  
drilling and  
cross tapping



# shockless indexing combined with independently-powered stock reel..

*gives greater sustained accuracy...longer machine life*



**SHOCKLESS, POSITIVE INDEXING** of the spindle carrier at high speed is accomplished by a Geneva mechanism. Indexing starts smoothly from a standstill, rapidly accelerates, then decelerates and comes to a dead stop without shock. Accurate location and positive locking of the carrier is assured by the locking pin mechanism.

**STOCK REEL IS INDEPENDENTLY POWER INDEXED** through a separate shaft and gear. This eliminates torsional strain and any tendency to whipping action, which might cause excessive wear on spindles and spindle carrier.

Acme-Gridleys are at their productive best when performing "secondary" operations during the primary setup—operations which otherwise would require additional time, machine investment, and floor space.

On an Acme-Gridley you can perform operations that require "on-the-button" indexing—such as cross-drilling and cross-tapping in successive spindle positions—with the same fourth-decimal-point-accuracy at the end of the shift as at the start.

And—your Acme-Gridley has power and stamina to spare, at the highest speeds and feeds that modern cutting tools can safely stand.

## LET US TELL YOU MORE ABOUT *Acme-Gridley BASIC DESIGN*

This is but one of many BASIC DESIGN features which are responsible for Acme-Gridley's outstanding performance records. May we send you additional information? Or, better yet, let us send a representative to discuss possible production short cuts with you.

# National Acme

THE NATIONAL ACME COMPANY • 173 EAST 131ST STREET • CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, New Jersey • Chicago 6, Illinois • Detroit 27, Michigan

# Comfort... NEEDS LUBRICATION, TOO!

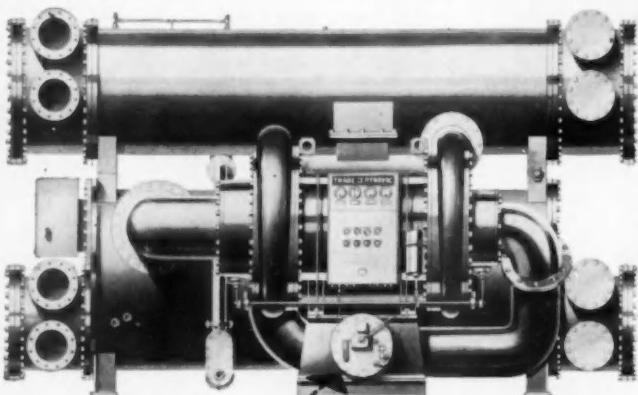
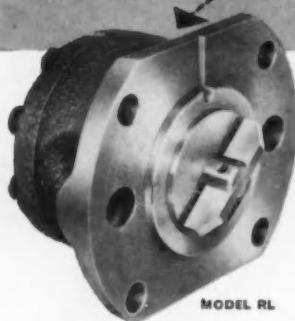


Photo of CenTraVac, courtesy The  
Trane Company, LaCrosse, Wisconsin



MODEL RL

## How TUTHILL PUMPS Help the Trane "CenTraVac" Keep Customers Cool

In developing the unique CenTraVac hermetic centrifugal refrigeration unit, Trane engineers required a positive lubrication system that would be both simple and foolproof. For the heart of this system, they selected the Tuthill Model RL—a positive displacement, internal-gear rotary pump with automatic reversing feature.

The performance characteristics of this pumping unit make it most dependable for pressure lubrication service. Model RL holds its prime and delivers the capacity needed instantly—a "must" in the CenTraVac, since full oil pressure must be developed before the unit will start—let alone operate.

Quiet in operation—also a "must" in CenTraVac—Model RL is built for long, uninterrupted service. Its automatic reversing feature offers further insurance of positive lubrication, since the pump will deliver from the same port regardless of ultimate direction of shaft rotation.

Whether you need standard or special pumps for lubrication, coolant, hydraulic, or liquid transfer service, you are invited to submit your specifications for recommendations.

*Write for catalog data on Tuthill pumps for your specific needs.  
See our catalog in Sweet's Product Design File—6b-Tu*



### TUTHILL PUMP COMPANY

Dependable Rotary Pumps . . . since 1927  
939 East 95th Street, Chicago 19, Illinois

Canadian Affiliate: Ingersoll Machine & Tool Co., Ltd.,  
Ingersoll, Ontario, Canada

## OBSERVATIONS

(Continued from page 194)

### Closed Circuit

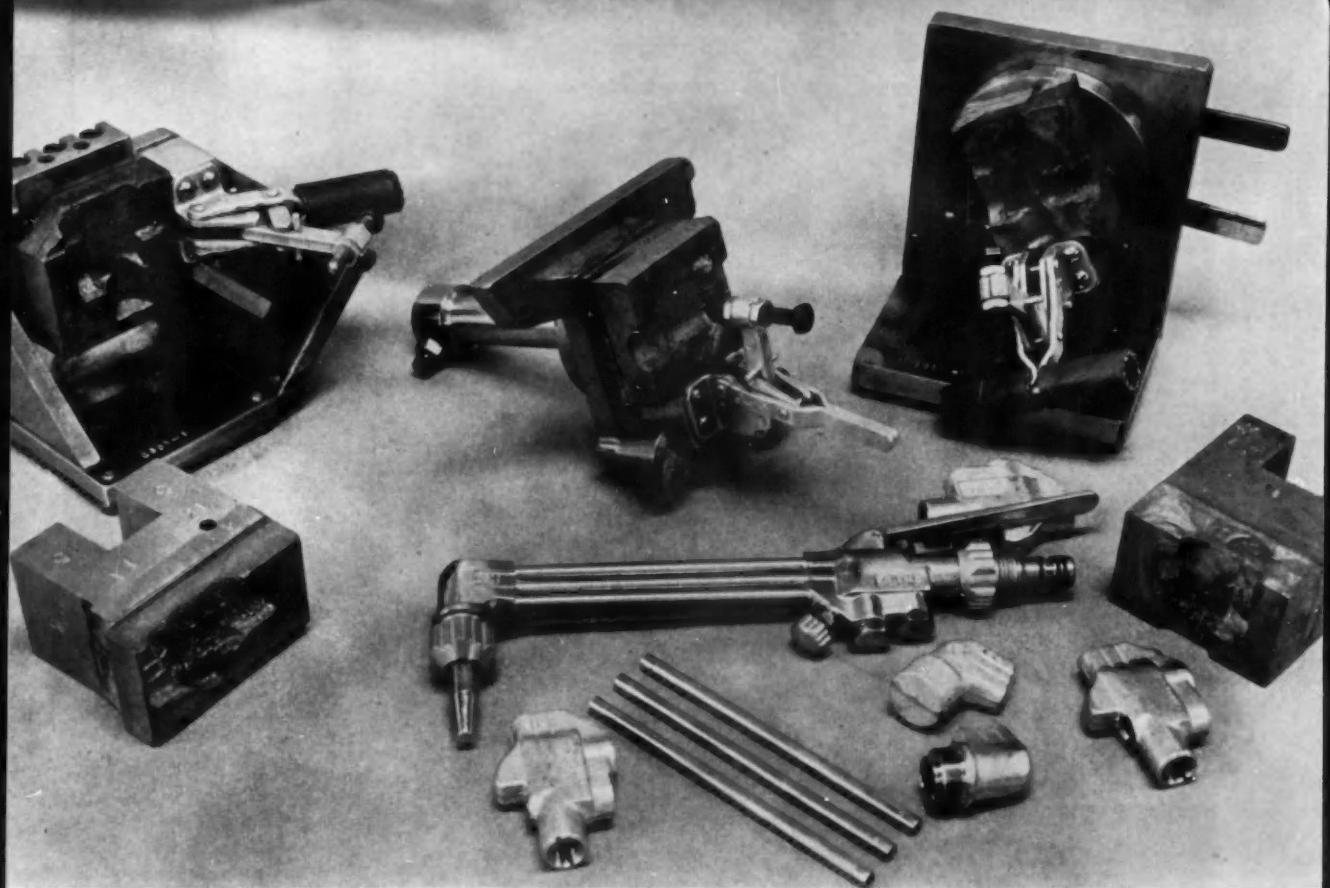
In the past few years we have cited noteworthy installations of closed circuit TV for industrial uses. Some have been used for remote control of loading and unloading operations such as loading freight cars or handling baled scrap. One of the most recent was the TV application on a Buhr transfer machine installed at Allison. The latest one we have noted was used by GMC in a test tractor-trailer rig at the GM Proving Grounds where the camera was located under the floor of the trailer to show the action of one pair of rubber air springs. Apparently applications of this useful device are limited only by the ingenuity of people.

### Muskegon Expands

How many people appreciate the importance of Muskegon as an automotive parts making center? It is the home of Sealed Power, Muskegon Piston Ring, and Johnson Products—makers of valve lifters. It is the original home of Continental Motors, one of the leaders in gasoline and Diesel engine manufacture, as well as producer of standardized engines for military use. It has two of the well known automotive foundries—C-W-C and Lakey. It is fast becoming a great metallurgical center with a centrifugal foundry specialist, a producer of basic materials for the precision casting industry, and the basing of the Misco precision casting plant which should be in operation early next year. In 1955 employment reached a high mark of 28,219; by March, 1956 this had risen to 28,971. By the time this item is in print employment may be down materially due to cutback in passenger car production and spotty business in farm tractors. Muskegon has acquired the status of one of the major centers of automotive parts activity, serving the entire industry and responsible for many advances in product design and techniques.

### Quality Control

Time was when tolerances of 0.001-in. were close. Today tolerances are in the tenths of thousandths (0.0001) and some are out to the fifth and sixth decimal place. In jet engine



Cutting torch and component parts made by Smith Welding Equipment Corp., Minneapolis, Minn., are shown with some of the plastic tools used in their manufacture.



Pouring tooling compound into mold to form chuck jaws. Lining up and pouring takes about half an hour. Compound hardens overnight. These epoxy compounds are produced by **Rezelin, Inc.**, Los Angeles 45, Calif.

## New tools made overnight with epoxy resins

Short production runs, frequent design improvements, and tight production schedules can benefit from tooling with compounds based on BAKELITE Epoxy Resins. Examples range from jigs, fixtures and chucking jaws for making the small precision parts shown here, to giant checking fixtures and Keller models used in automobile and aircraft manufacture.

These tooling compounds based on BAKELITE Brand Epoxy Resins are relatively easy to handle, and they harden at room temperature. The liquid resin is mixed with its liquid hardener and poured into place. Since curing shrinkage is negligible, the resulting tools are extremely accurate. They can be machined for further precision.

These properties mean that tools of

any size can be produced with speed and economy. The resin can cure overnight. You can have low-cost tools for many operations for which conventional tooling would be expensive. Write to Dept. SM-4 for free copy of our booklet, "Why Plastic Tooling."



**BAKELITE COMPANY**, A Division of Union Carbide and Carbon Corporation UCC 30 East 42nd Street, New York 17, N. Y.  
In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario

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work tolerances are approaching the vanishing point. We have reached the point where the closely guarded master gaging devices, used for checking shop gages, now are just good enough for production uses. A plant we visited recently, making jet engine controls, has one inspector for three workers. We wonder where this sequence of events will lead.

### Tail Pipes

One 1957 model we inspected recently has eliminated the tailpipe ex-

tensions through the rear bumper and will terminate them unobtrusively under the rear end of the car. Evidently the onus of the term *anus* applied to the bumper ports is taking its toll. Incidentally, it simplifies the bumper and makes the tail end cleaner.

### Tooth Rolling

Spline rolling has met with signal success in several large manufacturing plants. So much so that several other machine tool companies are

working on the development of equipment and methods for this purpose. Inevitably the next step will be larger machines capable of rolling gear teeth at least on small gears.

### Chipless Production

One of the major goals in machine shop practice is the development of chipless machining techniques. Among the most promising of these is the technique of metal spinning in which the weight of the rough blank is substantially the same as that of the finished part. Most familiar of the latest equipment for this purpose is the Cincinnati Hydrospin, and the Lodge & Shipley Floturn. Hydrospin, now available in a new version, is capable of impressing a force of some 50,000 lb of hydraulic pressure on spinning tools on both sides of the mandrel. This is sufficient to produce plastic flow in any material that has ductility. When we visited the experimental shop at the Mill, we were shown some startling examples of what the process can do. The shapes and formations have fantastic possibilities. One noteworthy example is that of making hydraulic cylinders from a blank. The cylinder can be produced to close tolerances on the bore with a burnished finish that requires no boring or honing.

Hydrospin research at Cincinnati has demonstrated the possibilities of producing steel tubing from a small blank. And one of the prize exhibits is a large cylinder spun from an alloy steel forging. This method eliminates the usual welded joint at one end, thus reducing fabrication cost. Spline rolling, a method first demonstrated by Michigan Tool, now has five or six companies developing equipment. Truly chipless production, the spline is rolled on a variety of shafts without removing metal. As chipless machining methods gain momentum, they will reduce the volume of raw materials in transit, reduce if not eliminate scrap and the handling of scrap, reduce machine time considerably, and in the long run reduce the amount of equipment normally required when chips are produced.

## **REO selects CENTURY AS FACTORY STANDARD LP-GAS CARBURETION**

*Exclusively*  
on Super V-63 Cab-Over Model  
**REO TRUCKS**

Four-barrel, down draft Century metering valve carburetor, factory installed on Super V-63 Cab-Over Reo Trucks.



Dual throat, down draft Century metering valve carburetor now optional equipment on all Reo Trucks.



### FOR PERFORMANCE

ONLY THE BEST is good enough for Reo Trucks... and Century LP-Gas Carburetors have proved best by every test, in both laboratory and road operation. That's why Reo selected Century 3C (controlled combustion) Carburetors as exclusive factory equipment on the Super V-63 Cab-Over Reo Trucks.

The big difference in the Century 3C is the metering valve, and it makes a big difference in engine performance. Why? Because the metering valve controls and proportions the gas to give perfect fuel-air mixtures at any throttle setting - starting, idling and full power - regardless of changes in temperature, altitude or pressure. No wonder Reo has joined the ever growing list of manufacturers who install Century Carburetion. Write for literature today! Sales and service everywhere.

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Set it!  
Seal it!  
Forget it!

## **CENTURY METERING VALVE LP-GAS CARBURETION**

### AUTOMOTIVE INDUSTRIES . . .

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**MANUFACTURING**

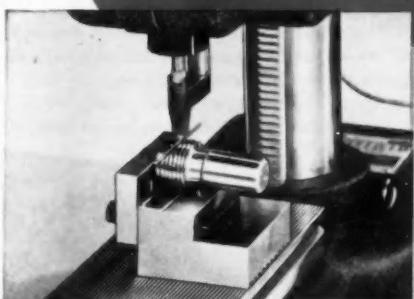
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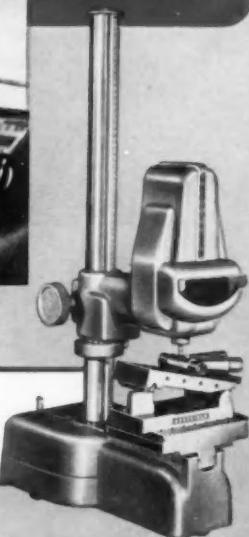
The Visual Gage being used to check O.D.



The Visual Gage in the toolroom.



Measuring the pitch diameter of tapered threads.



Using the sine bar fixture to check taper.



**SHEFFIELD**  
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7322

AUTOMOTIVE INDUSTRIES, September 1, 1956

Prove to yourself the real value of the Visual Gage right there in your own shop. You won't be obligated in any way.

See how simple it is—how fast—how sensitive—how positive—how rugged—and how easy to read.

See how many ways you can apply it to the precision work you are doing in the toolroom and in the shop.

The Visual Gage will with suitable accessories readily check angularity and any outside dimension including screw thread characteristics.

If you are working to "Tenths", ask for a Visual Gage having an amplification of 1000 to 1. If your tolerances are as small as ten millionths, ask for an amplification of 10,000 to 1. You have a choice of 5 amplifications.

THE SHEFFIELD CORPORATION

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DEPT. 4

Without obligation, we'd like to try a VISUAL GAGE in our shop.

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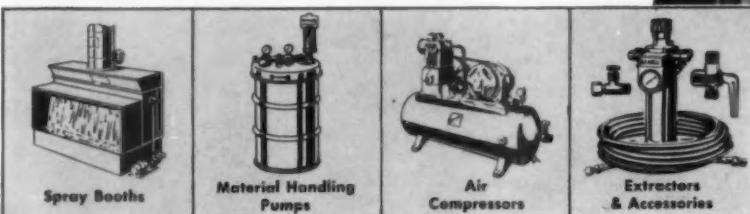
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finish or coating**

**Name your finishing material...**  
there's a Binks gun to spray it... a  
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## METALS

(Continued from page 168)

39,833 tons total by last February.

Impact of the steel strike, continued cutback in orders from users of diecastings and the slow pace set by brass mills in the Connecticut Valley, all conspired to make July the worst month of the year for the zinc industry. However, as the month closed there were some signs of improvement. Sales increased as steel furnaces were fired up and there was better buying of Special High Grade for automobile parts manufacture. No doubt heavier orders from both sources can be expected. In the meantime Government buying will continue in substantial volume for the stockpile, and this is expected to hold the price firm. The London price remains steady.

### Lead Price Steady

In contrast to zinc, lead demand has held up quite well. A diversified group of industries has taken sizable tonnages in a seasonally dull period. No change is expected in the price. The Government has accepted large offerings from producers for the stockpile, and it is expected this buying will hold the price steady. Better demand has been seen in Europe as well. Through the barter arrangement with foreign producers, it is reported the Government has acquired about 35,000 tons, which of course is frozen as a market menace. Battery shipments in June were only slightly less than a year ago, rather noteworthy as automobile production has dropped substantially.

### Price for Aluminum Less Than Expected

The new three-year labor contract signed by the aluminum producers followed the general pattern of the steel settlement as was expected. Prices for pig and ingot were immediately raised by about 1 cent per pound, to 25 and 27.1 cents respectively, thus preserving the usual differential. The increase amounted to four per cent above the price that had prevailed since March, and while somewhat less than expected, brought the new price to the highest in 30 years. Yet it appears doubtful if the modest price increase will compensate for the nine per cent higher labor costs resulting from the settlement.

The strike cost the industry about 24,000 tons of ingot production, or

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line-  
up...**

there's a specific  
*Lapmaster®*  
to give you:

**1 Precision Flatness**

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*in production quantities*

Parts large or small—tall or squat—whatever the case may be, there's a Lapmaster tailor-made to meet your production requirements at the lowest possible cost per piece.

If you are now lapping by other means—hand scraping or grinding—it will pay you to investigate the Lapmaster. Our fully equipped lapping laboratory is at your disposal to analyze your problem, test run a number of pieces and furnish you with a complete production report without obligation.

"John Crane" Lapmasters are capable of consistently producing flatness to less than one light band (11.6 millions of an inch), micro-inch finishes of 2 to 3 RMS on all materials including cast iron, steel, magnesium, aluminum, brass, carbon, ceramics and plastics.

Crane Packing Company, 6435 Oakton St., Morton Grove, Ill. (Chicago Suburb).

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These 3 booklets on Production Lapping and Light Band Reading are yours for the asking. Write today.



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**CRANE PACKING COMPANY**

slightly less than two per cent of the annual output rate. The loss will be more before full primary production is reached again. However, consumers were pretty well stocked up before the strike as was shown by lower demand for secondary metal in July.

### Tin Firms Up on Suez Seizure

By mid-August the price of Straits tin had moved up to 99 cents per pound, a considerable advance over the average price a few months ear-

lier. Strike threats in Malaya and the Suez seizure caused fear of a shortage in supplies, but this appears exaggerated. Nevertheless, the price in London will be affected by political uncertainties. The International Tin Agreement—unfairly referred to as the Tin Cartel—became operative July 1 and the first meeting of the Tin Council was held shortly after in London. Participating in the Agreement are the governments of 12 tin-consuming countries and of five tin-producing countries. Conspicuous by its absence is the United States which,

however, has declared a sort of benevolent neutrality. The aims of the Agreement are to achieve a reasonable price stability and adequate supplies at all times. The Council estimates that world tin supply and demand will be in approximate balance in 1956. Late estimates by the Bureau of Mines indicate that monthly tin consumption in the United States has been the largest since 1951, with tin plate accounting for over half the use.

### Tungsten Market Weakens

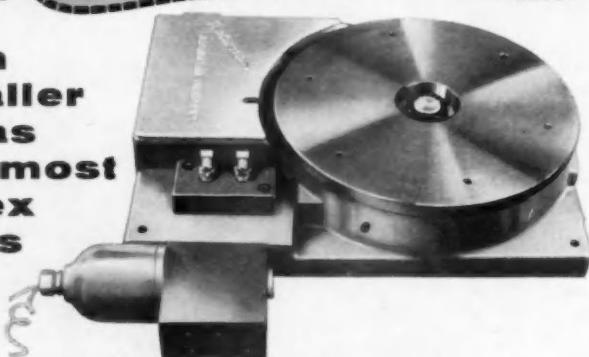
The market for tungsten ore is weak and likely to remain so. Domestic miners are breathing easier since the Government announced it will continue buying domestic-produced ore after completion of the present program. However, the price was set at \$55 per unit, instead of \$63, and no more than 5000 tons per month will be accepted from any one producer. This means that any excess must be sold on the open market, at a price of about \$33 per unit. Production, plus imports, continues to be in excess of consumption by a wide margin. In the unlikely event that trade is resumed with Red China, the foreign price will slump more as the large output from that country will come on the market.

### Titanium Output Mounting

National titanium output will receive a substantial boost when Republic Steel Corp. completes its program for raising output of ingots and alloys to 6000 tons a year. This will increase the company's present output four times. The big steel producer already has a half interest with the Crane Co. in Cramet, Inc., potentially able to produce 6000 tons of sponge annually. The entire program is expected to be completed in 1957. It will make Republic a completely integrated producer of titanium, with important sources of rutile, a preferred titanium ore, from owned deposits in Mexico now under development.

## NEW compact index fixture!

**fits in  
smaller  
areas  
than most  
index  
tables**



- ★ **it's a new, hydraulic-electrical, index fixture.**  
It's hydraulically operated and electrically controlled. It can be synchronized with the automatic cycling of your machine.
- ★ **designed for many uses with tool room accuracy.**  
It can be used for gaging, grinding, milling, broaching, boring, drilling, honing, checking, staking and assembly operations.
- ★ **no gears—no cams—no mechanical pawls!**  
And, no bang or shock, because the hydraulic cylinders provide a smooth action, and eliminate back lash. It's all hydraulic!
- ★ **positions on any index, from 3 to 120!**  
And, guaranteed to .0003 tolerance, on a 12" gaging diameter.
- ★ **and, it's really compact in design!**  
Even though the sub base is only 4 1/4" x 15" x 21 3/4", the table top is guaranteed flat and parallel, within .0001 of an inch. This table can be used with adapter plate as shown or four way valve.

Attractive territories now available.

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## New Strength and Safety for the "Second Greatest Show on Earth"

When P. T. Barnum rode the fabulous cog railway up New Hampshire's 6288-ft Mount Washington, he dubbed it "the second greatest show on earth." Every summer, some 35,000 riders tend to agree.

The locomotives chuffing stubbornly to the summit look like museum pieces, and the right of way is somehow reminiscent of a roller coaster at an amusement park. Yet from the time the line started nearly ninety years ago no passenger has lost his life.

The line jealously guards this safety record, and this summer is placing in

service a spanking new coach, its first all-metal one. With emphasis on light-weight construction, the car will have an underframe built of Mayari R high-strength low-alloy steel. With a yield point a good deal higher than that of carbon structural steel, the Mayari R frame members can be much lighter and still provide all the strength that will ever be needed.

This is an off-the-beaten-track example of Mayari R's value in railway, automotive, structural and general manufacturing use. Mayari R is unusually strong, is unusually paint-adherent,

and unusually resistant to corrosion and abrasion. It can be welded and worked as readily as carbon steel. Catalog 353 explains it in detail, and shows dozens of interesting applications. You can get a copy through our nearest sales office.

BETHLEHEM STEEL COMPANY  
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**Mayari R** ...High-Strength, Corrosion-Resisting Steel

# Why TECUMSEH Compressor Crankcases Are MICROHONED

"On Tecumseh compressors, we Microhone the piston bores. This gives us a running seal between pistons and bores which prevents gas leakage and eliminates the need for piston rings! Believe me, it takes a real combination of accuracy and functional surface finish to get results like that... and only Microhoning has given us that combination!"

(Tecumseh Products Company, Tecumseh, Michigan, is the world's largest producer of refrigeration compressors. Precision engineered and processed these units are hermetically sealed before leaving the factory.)



#### OTHER JOB DATA:

MATERIAL	Cast iron
PRECEDING OPERATION	Diamond finish-bore
MICROHONING OPERATIONS	One
STOCK REMOVAL	.0007" to .001"
FINISH	10 Microinches
TOLERANCES	
Diameter	.0003"
Roundsness	.00015"
Straightness (Taper)	.00015"
HONING CYCLE	18 seconds, including fixture indexing time

"Here's our twin cylinder crankcase. The two piston bores in each case are opposite one another in the vertical plane, but they lie in two different horizontal planes. We simultaneously Microhone both bores in each crankcase, using a horizontal type machine with two opposing spindles."

"Although all of our crankcases are similar in design, the bores vary in diameter — 1.312", 1.375", 1.500" and 1.625". Two fixtures on a two-position rotary indexing table let us Microhone one crankcase while another is being loaded. To run different bore diameters we just change the tools and gage rings. Switchover time is about five minutes."

Let a Micromatic Field Engineer show you how Microhoning will give you better functional finishes, closer tolerances and higher production.

- Please have a Micromatic Field Engineer contact us.
- Please send literature and case histories on Microhoning.

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CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



## MICROMATIC HONE CORP.

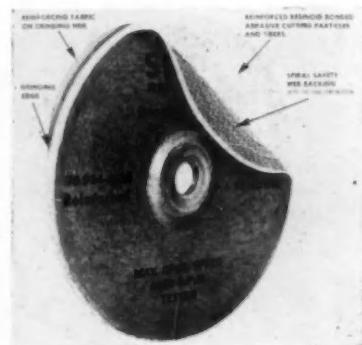
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

## Specialized Equipment SECTION

(Continued from page 160)

### SIMONDS ABRASIVE CO.

GRINDER WHEEL—High-speed Simex Red Wheels for use on portable disk type and right-angle type grinders have a special safety web backing of spiral wound rayon auto tire cord. The wheels are made in depressed center or raised hub shape in 7 and 9 in. diameters by 3/16 and 1/4 in. thicknesses. Application is for rough, tough production grinding, especially



for grinding welds, and for all types of stainless steel.

Wheels are made from a wheel mix consisting of abrasive cutting particles and synthetic resin bonding agents, reinforced with alpha cellulose fibers criss-crossed and knitted together throughout the wheel mass. In addition to the extra safety web backing on the top side, the under side is further strengthened with a layer of reinforcing fabric. There is a knurled or file-type pattern on the grinding or cutting side of the wheels to increase their cutting action.

Circle 249 on postcard for more data

### INGERSOLL-RAND CO.

NUT RUNNER—Torque Control Impactool No. 5040T incorporates an application of the torsion bar principle to torque control. While the nut is being run to required torque, the new Impactool operates at normal power and speed, but when required torque is reached and nut-running resistance is equal to the stress preset in the torsion bar, the impact mechanism rebounds instantly and trips a rubber-faced shutoff valve. There is no

## Specialized Equipment SECTION

clutch, and operation does not depend on the operator's timing.

Torque can be easily and quickly set by using a jig which turns a torsion bar and calibration collar to the

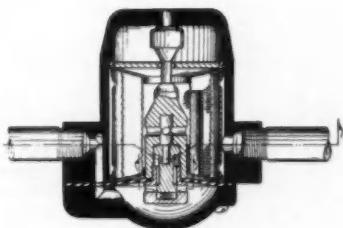


desired reading, against rigid splines on the torque bar adjusting sleeve. The tool can be set to the required torque in a few seconds. Torque setting remains constant for any nut-running operation until the adjustment is changed. Releasing the trigger resets the tool automatically.

**Circle 250 on postcard for more data**

### EMCO PNEUMATIC CO.

**AIR FILTER**—Model L-200A lightweight air filter is designed to be applied to hand tools directly. Fully automatic and self-adjusting, the unit weighs 12 oz vs 1 1/4 lb for the previous



model. It is said to eliminate sludge, abrasive substances, rust, scale and moisture.

Model L-200A operates by the differential of pressure. As the air flows through the unit, substances with a specific gravity greater than air collect in the main filter chamber of the unit. Sudden stoppage of the

(Turn to page 208, please)

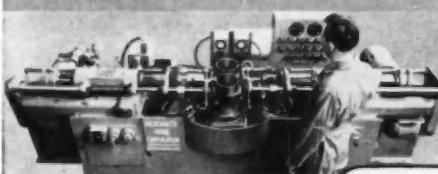
# How MICROHONING Makes a Gas-Tight Running Seal Without Piston Rings

A leak-free, running seal between bores and pistons—without the use of rings—is possible only when the processing method generates diametric and geometric accuracy and the required functional surface finish. These characteristics are simultaneously obtained by the Microhoning process. Here's how:

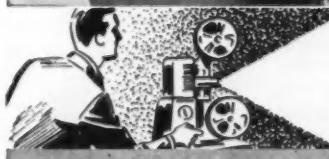


- 1 The sticks of abrasives in the tool form an abrasive "cylinder" and are fed out radially with equal pressure in all directions. High spots and tight areas in the bore are abraded first.
- 2 The long abrasive sticks cut only on the crests of wavy or snaky surfaces until the bore has the same diameter throughout its full length.
- 3 The combination of tool motion (rotation and reciprocation) and feed pressure fractures the abrasive grits that have become dull, and new sharp edges are formed; the clean constant cutting action of every stroke on the full bore length consistently generates the desired surface finish.

One of the exclusive advantages of Microhoning is its ability to produce whatever functional surface characteristics are required for maximum product performance. Microhoning's cross-hatch pattern, with its myriad of minute intersecting "valleys," furnishes an excellent surface for retention of lubrication.



"Here's one of two Micromatic Model 523-2 machines used on the compressor crankcase job. Tecumseh uses a total of 18 Microhoning machines on other vital processing operations."



The principles and applications of Microhoning are thoroughly explained in an informative 16mm., 30-minute sound movie, "Progress in Precision." We'll be glad to reserve a print for your use. Just tell us on the coupon the date you'd like to see it.

- Please send me "Progress in Precision" in time for showing on \_\_\_\_\_ (date)  
 Please send literature on Microhoning. I am interested in the following application:

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COMPANY \_\_\_\_\_

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## MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

## Specialized Equipment SECTION

(Continued from page 207)

air flow causes the internal valve to change position. During this brief instant, the water and foreign substances collected are jettisoned through the opening at the bottom of the separator. This process is

repeated each time the air is released and stopped. The unit has a range of from one to 20 cfm. Its operating range is from 60 to 250 psi air pressure.

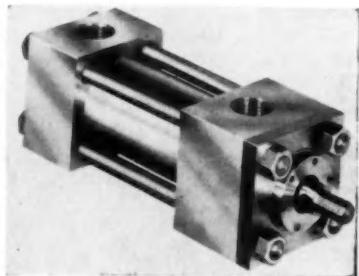
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### ORTMAN-MILLER MACHINE CO.

**HYDRAULIC CYLINDER**—A heavy-duty hydraulic cylinder, rated at 2000 psi, is said to meet JIC standards and to be built for dependable perform-

ance under severe industrial operations.

Specifications and featured items include: Heavy walled seamless steel tubing micro-honed for minimum friction; rolled steel heads recessed to confine the tube, prevent breathing and provide additional protection



## HANSEN SERIES RL QUICK-CONNECTIVE RING-LOCK COUPLINGS



HANSEN  
SERIES RL  
EFFECTIVELY  
HANDLES MORE VOLUME  
THAN ANY OTHER  
COUPLING OF EQUAL  
DIMENSIONS

Hansen Series RL One-Way Shut-Off Couplings will handle any job in your shop using  $\frac{3}{4}$ " to  $\frac{1}{2}$ " connections—from the air line to the air tool. All Hansen Series 2-RL Sockets and Plugs are interchangeable with each other. Likewise all Sockets and Plugs of the slightly larger, greater capacity Series 3-RL are similarly interchangeable with each other.

Consequently, by standardizing on either Hansen Series 2-RL or Series 3-RL Couplings, you eliminate any need for various size couplings in your hook-up—make it easy to keep stock of parts in balance—and hold inventories to a minimum.

Locking ring provides positive lock and assures tight fit. Equipped with automatic sleeve lock.

Two-Way Shut-Off and Straight-Through Couplings also available.  
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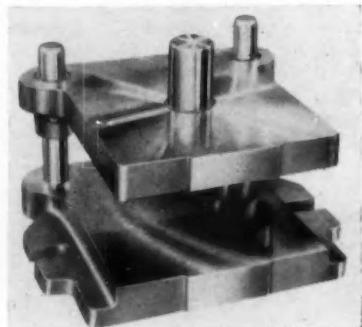
HANSEN  
SERIES RL  
HANDLES ANY JOB  
WITH FITTINGS FROM  
 $\frac{3}{4}$ " TO  $\frac{1}{2}$ ", FROM  
THE AIR LINE TO  
THE AIR TOOL

against leakage; piston rods hard chrome plated, turned, ground and polished from stress-relieved high-tensile steel; multiple lip self-compensating rod gland packing, providing pressure sensitivity with long life. This packing is contained in a removable cartridge which facilitates replacement without disassembling the cylinder.

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### DANLY MACHINE SPECIALTIES, INC.

**DIE SETS**—A complete line of die sets and diemakers' supplies with a high degree of accuracy and long service life are now available. Precision lapped chrome-plated guide posts are



standard in all precision units. All four horizontal surfaces, including the top of the punch holder, are ground to a high finish for accuracy in positioning. The sets are available in all standard sizes listed by the ASA as well as in a broad range of other sizes.

Circle 253 on postcard for more data  
(Turn to page 210, please)

# FRAM research pioneers filter progress



## Man-made Dust Storm

Here in the world's only full scale dust tunnel, Fram engineers create choking dust conditions to test and compare filter efficiency. Wind, dust concentration and dust particle sizes are carefully controlled. Tunnel is large enough to accommodate even trucks and buses.

**The FRAM Institute** of Advanced Filter Research and Design at Dexter, Michigan, is the leading research center of its kind in the world. Here, FRAM scientists and engineers are engaged in the continual study of new filtration methods and materials . . . testing new filter systems in the giant FRAM Dust Tunnel and in actual test car operations.

FRAM engineers work closely with automotive manufacturers in designing and developing special filter systems to exact specifications and requirements. The facilities and personnel of the FRAM Institute are at your disposal if you have a filtration problem—whether oil, air, fuel or water. For information, write, wire or phone the address below.

### Test Results Prove Filter Value

After test runs as long as 40 hours, each engine is completely disassembled and each part carefully weighed and studied for resultant wear.

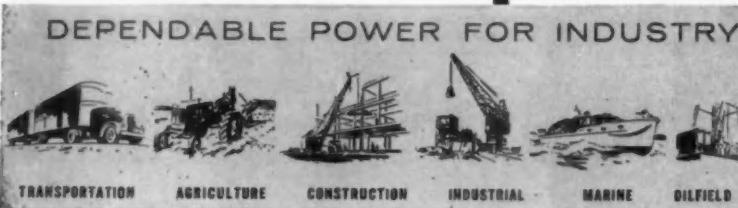
### Tests Lead to Improved Designs

At the drawing board, the test findings shape new and improved filter designs. Research, testing and design is a never-ending project at the Fram Institute.

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**MOTORS**  
Today



TRANSPORTATION      AGRICULTURE      CONSTRUCTION      INDUSTRIAL      MARINE      OILFIELD

Yes, this is Hercules Motors, today—all types of dependable power for modern industry. The Hercules line includes more than 90 different models of engines and complete power units ranging from 3 to 500 H.P.

An ever-growing list of customers are solving their power problems with these types of Hercules Engines: L-head gasoline, overhead-valve gasoline, natural gas, L.P.G., turbulence-chamber diesels, direct-injection diesels, Turbo-Charged Diesels, marine diesels and complete open, closed and base type power units.

Write for more information on any of these dependable power plants. Our sales-engineers will be happy to help solve your power problems. No obligations, of course.

**HERCULES MOTORS CORP.**

Engine Specialists Since 1915 • Canton, Ohio



**Specialized Equipment**  
**SECTION**

(Continued from page 208)

**HYDRA-FEED MACHINE TOOL CO.**

TRACER ATTACHMENT—A unique combination of hydraulic tracer turning and auxiliary tooling on a rear slide enables automobile stem pinions to be completely machined in a single tracer lathe. The part, an SAE 4620 forging, is machined at a spindle speed of 1046 rpm and 0.027 in. feed. Turning is done dry or with coolant.

In order to do the job in a single chucking, including turning the head, carbide driving inserts are used on the spindle and eliminate the need for any chucking arrangement that would interfere with taking this cut.

Nearly two pounds of metal are removed. The rear carriage with its special tooling turns the thread diameter and the head while the tracer turns the stem.

Circle 254 on postcard for more data

**GITS BROS. MANUFACTURING. CO.**

LUBRICATOR—An air line lubricator, called the Airliner, atomizes the oil in a chamber remote from the air line. Oil mist is injected into the air stream, metered in particles fine enough to approach the lightness of



air itself, so that the particles travel farther along the air line. Heavier particles fall back into the oil reservoir. Whereas oil drops injected into the air stream reportedly provide lubrication in densities and cycles vary-

(Turn to page 212, please)



# TUNG-SOL® VISION-AID HEADLAMPS

5040-S for 6 volt passenger cars  
5400-S for 12 volt passenger cars  
5440-S for 12 volt trucks and buses



## WITH E·Z AIM PLATFORMS FOR USE WITH ANY APPROVED AIMING DEVICE

The new improved Tung-Sol Vision-Aid Headlamp can be quickly adjusted with any approved aiming device—or can be aimed visually. Three E-Z Aim Platforms, precision-molded on the face of the lens, provide contact points for all the new mechanical aimers. They assure accurate beam adjustment in a matter of minutes—even in broad daylight. These headlamps are fully interchangeable with all sealed beam headlamps of the same voltage.

Car owners benefit from wonderful new safety features of all Vision-Aid Headlamps: The new, more powerful beam gives 80 extra feet of seeing distance down the right side of the road; the filament cap and new lens design improve visibility in rain, fog and snow.

They insure complete satisfaction for car manufacturers, because traditional Tung-Sol quality and nationwide distribution more than meet performance and service requirements.

TUNG-SOL ELECTRIC INC., NEWARK 4, N. J.  
Sales Offices: Atlanta, Columbus, Culver City, Dallas, Denver, Detroit, Melrose Park (Ill.),  
Newark, Philadelphia, Seattle, Canada: Montreal.



80 EXTRA FEET OF SAFETY...ACCURATELY AIMED!

# Specialized Equipment SECTION

(Continued from page 210)

ing with the frequency of the drops, the Airliner's mist is said to provide constant lubrication throughout the entire operational period, with every particle of air carrying some lubricant.

Circle 255 on postcard for more data

## SANBORN CO., INDUSTRIAL DIV.

**A M P L I F I E R**—Wide band driver amplifier-power supply, model 150-300/700, accommodates any of 11 available interchangeable, plug-in 150 Series preamplifiers. Designed for rack-mounting in the user's laboratory or research equipment, the new amplifier is intended to drive a low power galvanometer element, panel meter and/or oscilloscope, individually or simultaneously. Frequency range is dc to 10,000 cps, or the limits of the 150 preamplifier used with it.

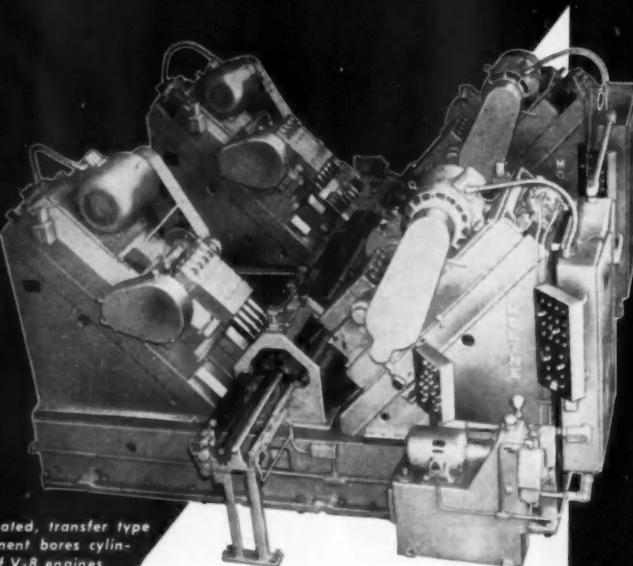
Circle 256 on postcard for more data

## PANGBORN CORP.

**DUST COLLECTOR**—Ventrijet wet dust collector eliminates dust from the atmosphere by mixing air and water.

Dust laden air enters the unit collector and expands in the inlet chamber at reduced velocity. The heavier particles sink to the bottom of the tank as sludge. The air is drawn through one or more venturi tubes into the discharge chamber, and the low pressure area in the venturi throat induces water also to enter the high velocity air stream. This mixing of air and water causes the transfer of dust particles from the air to the water particles. The air, water and sludge mixture impinges at high velocity on special surfaces in the dis-

## For Greater... PRODUCTION • EFFICIENCY • SAVINGS



Automated, transfer type equipment bores cylinders of V-8 engines and chamfers both ends of bores.

Use an individually designed "Hole-Hog" Machine Tool for such jobs as:

- Multi-Spindle Boring
- Single and Multi-Spindle Honing
- Straight Line Multi-Drilling
- Adjustable Spindle Drilling
- Vertical and Way-Type Fixed Center Drilling, Boring and Tapping
- Special Multiple Operation Machine Tools

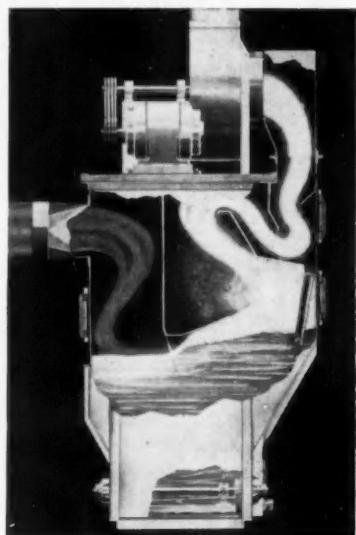
Over 50 years of Machine Tool Engineering experience is at your service. Tell us your particular problem.

Representatives in principal cities.  
101



MOLINE TOOL COMPANY  
100 20TH STREET

MOLINE, ILLINOIS



charge chamber, and the sludge settles to the tank bottom. The washed air then flows through an eliminator section for removal of droplets, and clean air is discharged.

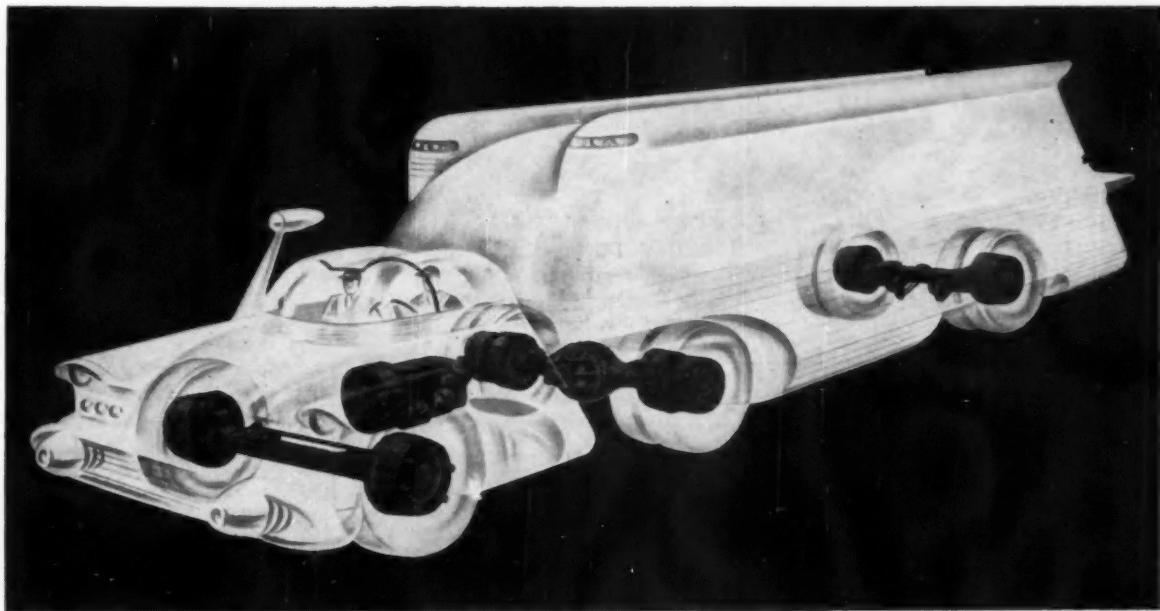
The unit is available in a range of capacities from approximately 1,000 to 30,000 cfm in single and double row tube types.

Circle 257 on postcard for more data

## CRUCIBLE STEEL CO. OF AMERICA

**STEEL**—High-speed steels, produced by a new processing technique, assure the tool maker of reproducibility within every bar from center to edge, end to end and shipment to shipment. Tools can thus be made having a more uniform response to heat treatment, size change and service life, and with a greater predictable performance.

Circle 258 on postcard for more data  
(Turn to page 214, please)



## Good Engineering—aimed at **MORE PROFITABLE PERFORMANCE**

### **CLARK AUTOMOTIVE PRODUCTS**

TRANSMISSIONS  
AXLE HOUSINGS  
TRACTOR UNITS  
TORCON TORQUE CONVERTERS  
ELECTRIC STEEL CASTINGS  
GEARS and FORGINGS  
FRONT and REAR AXLES for TRUCKS,  
BUSES and OFF-HIGHWAY EQUIPMENT  
send for Booklet  
Products of Clark

Here is a business that has grown steadily, soundly, by making itself essential in a vital area of vehicle performance—engine torque transmission.

- For more than 50 years Clark engineering has studied power transmission—those quiet, hard-working components that are the leg-muscles of revenue vehicles. Users of those components believe they are getting the best their money will buy. So do we.
- For 25 years and more Clark has been building materials handling equipment; and in later years, construction machinery—end-product machines using Clark power-transmission components. Again, users are convinced that those machines are better because of their Clark-engineered components. So are we.

It is high approval of any working vehicle or machine to say that from engine flywheel to point of torque application, its power-train is engineered and manufactured by Clark Equipment.

That is why leading manufacturers say with conviction: It's good business to do business with CLARK.

**CLARK EQUIPMENT COMPANY, Buchanan,  
Battle Creek, Jackson, Benton Harbor, Michigan**

**CLARK®  
EQUIPMENT**

# Specialized Equipment

## SECTION

(Continued from page 212)

### STOW MANUFACTURING CO.

**FLEXIBLE SHAFT MACHINE**—V50 overhead-type machine is designed to be hung on a swivel mount, from an overhead trolley. The  $\frac{1}{2}$ -in. shaft will transmit up to three hp.

It is belt driven at speeds up to 5750 rpm. The belt and pulleys are fully guarded and easily changed. Tools for reaming, grinding, buffing, sanding, wire brushing and drilling can be used.

Circle 259 on postcard for more data

### NEW YORK AIR BRAKE CO.

**HYDRAULIC PUMP**—Hydrex PA-3000 series base-mounted gear-type hydraulic pump, designed especially for industrial use, has a straight key

shaft for pulley drive or rigid and flexible couplings, operates at pressures up to 1500 psi at 2000 rpm, and delivers 40 to 70 gpm. Pressure-balanced wear plates permit a fixed clearance to be maintained between the wear plates and the gear faces regardless of pressure. Thus oil leakage is reduced to a minimum, and there is no excessive power loss due to the force of the plate against the gears, it is said.

Circle 260 on postcard for more data

### VASCOLOY-RAMET CORP.

**FACING TOOL**—A new line of face mill cutters designed around the V-R elevator toolholder principle feature the use of throwaway carbide inserts which eliminate grinding. When cut-



## fixed-bundle heat exchanger

provides greater capacity per square foot of surface

Wherever there's a temperature-control problem, there's a place for a Yates-American Heat Exchanger:

Diesel engines  
Torque converters  
Die-casting machines  
Field processing plants  
Hydraulic presses  
Solvent coolers  
And many other applications

It's new—but field-proven! It upholds Yates-American's 74-year reputation for top quality.

Features like these protect your investment: Tubes are bonded to flanged baffles, to eliminate vibration wear.

Tube joints are rolled, for permanently tight connections.

Copper and copper alloys are used throughout, for long service life.

2" to 10" sizes—single-pass, 2-pass, and 4-pass designs—are now in production. Other fixed-bundle models available on special order. Removable-bundle types soon in production.

Bulletin HT-1 gives detailed information. Send coupon for your copy.

## Yates-American

BELOIT, WISCONSIN CHICAGO, ILLINOIS,  
HIGH POINT, N.C., MEMPHIS, TENNESSEE, PORTLAND, OREGON

### YATES-AMERICAN

Dept. K, 751 N. Fourth St., Beloit, Wis.

Send me Bulletin HT-1.

Name \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

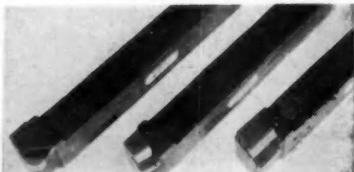
Tear out  
coupon and  
mail today!

ter is dull, all inserts are indexed to new cutting edges without necessity of gaging each tooth to assure uniformity of cutting edges. Cutters will be available in 4, 6, 8, and 10-in. diam.

Circle 261 on postcard for more data

### CARBOLOY DEPT., GENERAL ELECTRIC CO.

**TOOL HOLDER**—A newly designed tool holder with a carbide pad for throw-away-type carbide insert blanks makes it possible for cutting tools to operate with less overhang while providing greater rigidity. Chip



interference as well as any projections under the shank are eliminated. A screw adjustment on top of the holder simplifies indexing the carbide cutting blank. Only a light tightening

(Turn to page 216, please)

# *Announcement!*

## **...Cleveland**

### **now offers a complete line of**

#### *Top Quality*

#### **Socket Screws**

Our line of socket screws has been expanded to include all standard socket items, in all catalog sizes, made to Cleveland's extra high standards of quality.

Among the facilities already in use at the modern new

Cleveland plant is this spacious metallurgical and chemical laboratory.



**Socket Head Cap Screws**

**Socket Set Screws**

**Flat Head Socket Cap Screws**

**Button Head Socket Cap Screws**

**Shoulder Screws**

**N.P.T.F. Pressure Plugs**

**Socket Screw Keys**

**Precision Dowel Pins**

Complete stocks of Cleveland Socket Screw Products are available for immediate shipment. Write for new Socket Line Folder.

**The Cleveland Cap Screw Company**

2955 East 79th Street • Cleveland 4, Ohio • VULcan 3-3700 TWX CV-42

Warehouses:  
Chicago • Philadelphia • New York • Providence • Los Angeles

## Specialized Equipment SECTION

(Continued from page 214)



Special B Fasteners — Sample brochure sent upon request

### WE MAKE ANY SPECIAL ... practically

- Frankly, many of our customers design and specify exactly the special fastener they want. Others prefer the cooperation of our designers.
- The important thing is that our production men have the equipment and the skill to produce them accurately and economically... and on time for your production schedules.
- If any fastener shown here sparks an idea, why not call us in. (For convenience, refer to fasteners by number.)

#### BUFFALO BOLT COMPANY

Division of Buffalo-Eclipse Corporation

NORTH TONAWANDA, N. Y.

#### ● 3 convenient service centers

**WESTERN OFFICE**  
Chicago  
HArrison 7-2179

**EASTERN OFFICE**  
New York City  
REctor 2-1888

**CENTRAL OFFICE**  
North Tonawanda  
JAckson 2400 (Buffalo)

Many **GOOD** products  
can be made **BETTER**  
...with



**SPECIAL  
FASTENERS**

torque is required to hold the carbide insert blanks. The clamp also serves as a fixed chip breaker to provide uniform chip control. It can be furnished in several sizes.

The new holder will be produced in five basic styles. Style A, for internal boring and chamfering, will also include two modified types to handle both triangular and round carbide inserts. Style B for internal facing, turning and chamfering will handle 30-deg triangular and 15-deg square inserts. Style G is an offset type to handle triangular inserts for facing. Style F is for parallel turning, straddle and perpendicular facing and recessing. Style D, which includes a 30-deg lead angle, is for contour turning and lead angle cutting.

Circle 262 on postcard for more data

#### STANDARD PRESSED STEEL CO.

**SET SCREWS**—Unbrako socket-head set screws can be tightened up to 40 per cent tighter than ordinary set screws, according to the maker. Claims made include greater holding power, more uniform fit, and better wear life. These are based on fully formed threads, deeper sockets, fillets, harder socket walls, and self-locking cup point.

Circle 263 on postcard for more data

#### DOW CHEMICAL CO.

**PLASTIC PANEL**—A strong, lightweight, insulated plastic sandwich construction panel with a wide variety of potential industrial uses has been developed by Haskelite Manufacturing Corp. The panel, called Hasco-Struct, is composed of a Styrofoam expanded polystyrene core with a facing of glass fiber cloth reinforced polyester sheet. In addition to lightweight, structural strength and thermal-insulating properties, the panel is also moisture-proof and corrosion-resistant. The core with a density of two lb per cu ft or higher is covered with the polyester reinforced glass fiber cloth in 0.018 and 0.032-in. thickness. The standard sandwiches are 1, 2, 3, 4 or 6-in. in thickness. Special sizes run as high as 18 in. Standard width is 48 in. with lengths 96, 120 or 144 in.

Circle 264 on postcard for more data

We can match any **DESIGN**

with Inland Self-Sealing  
Weather Strip

No matter what your sealing problem is, or will be—whether in glass or plastic; flat or curved; fixed or sliding window—Inland Self-Sealing Weather Strip, with separate patented filler strip, will solve it. And when Inland Strip goes in, water stays out! In cars, trucks, buses, trains, planes and other over-the-road vehicles and in any structures where windows are fixed and must be positively sealed—Inland Weather Strip is the answer!

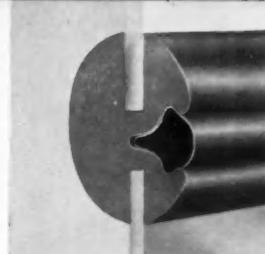
Inland Self-Sealing Weather Strip can be produced to meet your individual requirements, and is always available in many standard shapes and sizes.

When you specify Inland Weather Strip you can be sure it will be precision made and you are also assured of a long, trouble-free service life.

**INLAND**  
*self-sealing weather strip*  
(PATENTED)



INLAND MANUFACTURING DIVISION  
General Motors Corporation, Dayton, Ohio



a part of the General Motors Master Plan for Greater Highway Safety through Better Engineered Products!

Whatever  
the **DESIGN...**

We can make it  
**WATER-TIGHT!**



Transportation Industry



Automotive Installations



Railway Equipment



Marine Applications



Over-the-road Equipment



Commercial Structures

## MEN in the NEWS

(Continued from page 192)

Chain Belt Co.—W. J. Sparling is now vice-president of manufacturing and industrial equipment; O. W. Carpenter, vice-president, construction machinery and finance; E. M. Rhodes, manager of chain operations; J. D. Sloan, manager of the Roller Chain Div.; and W. C. Messinger, manager of the Construction Machinery Div.

Twin Coach Co.—Stuart N. Smith and George R. Hecht, have been elected vice-presidents.

American Airlines de Mexico, S. A.—Walter G. Conrad has been appointed sales director.

Aviation Developments, Inc.—E. D. Wilgus has been appointed vice-president and general manager.

L.O.F. Glass Fibers Co.—Fred W. Segerstrom has been appointed General Sales Manager of the General Products Div.



Sealed Power Corp. of Canada, Ltd.—D. C. Gibbard was named sales manager.

L. O. F. Glass Fibers Co.—Don McAnally has been promoted to manager of distributor sales.

SKF Industries, Inc.—Raymond E. Coward has retired as manager of ball sales.

Goodyear Tire & Rubber Co.—Ted M. Kersker was named manager of fabric development for all tire divisions; Boyd C. Eberhard, chief engineer in charge of tubes and accessories, and J. M. Linforth, vice-president in charge of manufacturers', Government and aviation products sales, have retired.

Thompson Products, Inc.—Bernard E. Ricks has been named plant manager of the new Detroit plant.

Ford Div., Ford Motor Co.—William V. Luneburg was chosen manager of the Dearborn, Mich., assembly plant.

E. W. Bliss Co.—George T. Pfifer is now vice-president in charge of finance.

Solar Aircraft Co.—Fred S. Hage, Jr., today was named director of public relations.

Yale Materials Handling Div., Yale & Towne Manufacturing Co.—Frank Boufford is now western regional sales manager.

Armstrong Cork Co., Industrial Div.—William W. Kinzer is now sales training and promotion supervisor.

Mack Trucks, Inc., Parts Div.—James J. Madison was chosen merchandising manager.

Four Wheel Drive Auto Co.—Warren R. Snider is now manager of ready-mix and logging markets.

Manhattan Rubber Div., Raybestos-Manhattan, Inc.—R. F. Teeling has been made manager of the new eastern sales region.

Scovill Manufacturing Co., Forging and Screw Machine Div.—W. H. Machin was named manager, and N. J. Schaffer was made factory superintendent.

General Electric Co.—Elton A. Turner has been named manager of finance for the Metallurgical Products Dept.

You can be a hero too!

**STOP CASTING LEAKS**

**IN TRANSMISSION PARTS**

**POWER BRAKE PARTS**

**POWER STEERING PARTS**

**GASOLINE ENGINES, ETC.**

**WITH**

**METASEAL**

You too can save the day . . . if your production department is flooded with casting rejects, if materials and machining losses are piling up, let METASEAL make you a hero.

Now you can save materials, time, skilled labor and dollars usually lost by casting porosity. Method is versatile . . . works in all metals, including copper, sand castings and powder metal parts.

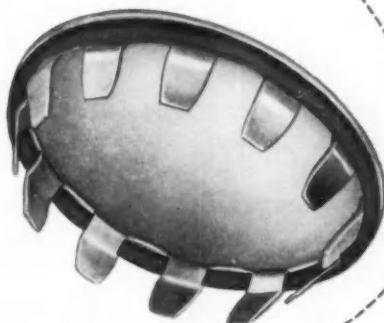
Whether it's an instrument housing, a hydraulic unit or a valve body . . . whether you're sealing a liquid or a gas—METASEAL assures permanent protection. And, best of all, METASEALING conforms to all military specifications.

**Metaseal**

AMERICAN METASEAL OF DETROIT

18666 FITZPATRICK AVE., DETROIT 28, MICH. VERMONT 8-5941

P.S. IMPREGNATING SYSTEMS BUILT TO YOUR ORDER



**W506 COMPOUND** — one of several standard DAREX "Flowed-in" compounds now being used by the automotive industry.

Base: Buna

Permanent Set: 30%

Adhesion to metal: Good

Curing Time: 20 Minutes

Heat Resistance: 0°F to 250°F

Consistency: Uniform sponge

Oil Resistance: Good

Uses: Metal to metal seals against water, dust, dirt, fumes, vibration

Aging: Excellent

{ Dewey and Almy does not make the "snap-in" parts shown. We supply their manufacturers with gasketing compounds and machines to apply them. }

Cambridge 40, Massachusetts • Chicago 38, Illinois

with  **DAREX**

  
**GASKETS**

When "snap-in" parts are pre-gasketed by the DAREX "Flowed-in" Gasket Process:

- You get a tight seal that prevents vibration, seals out water, dust, dirt and fumes
- You save by eliminating costly hand assembly of gasket to part
- You know that there's no chance for a worker to drop or forget the gasket

Knock out plugs and electric socket housings typify a whole family of "snap-in" parts on which automotive manufacturers are saving thousands of dollars yearly by using DAREX "Flowed-in" Gaskets.

The DAREX "Flowed-in" Process is ingeniously simple. A DAREX gasketing compound is *machined-flowed* directly into the part. This "flowed-in" compound is then cured to form a solid, rubbery gasket which becomes *integral* with the part. Since part and gasket are joined as one unit, your assembly line installation is speeded up. And you get a *positive seal* at lower cost than ever before.

Send today for the DAREX "Flowed-in" Gasket Brochure. In pictures and text, it shows a variety of applications in which this fresh approach to industrial gasketing can save motions, time and money.

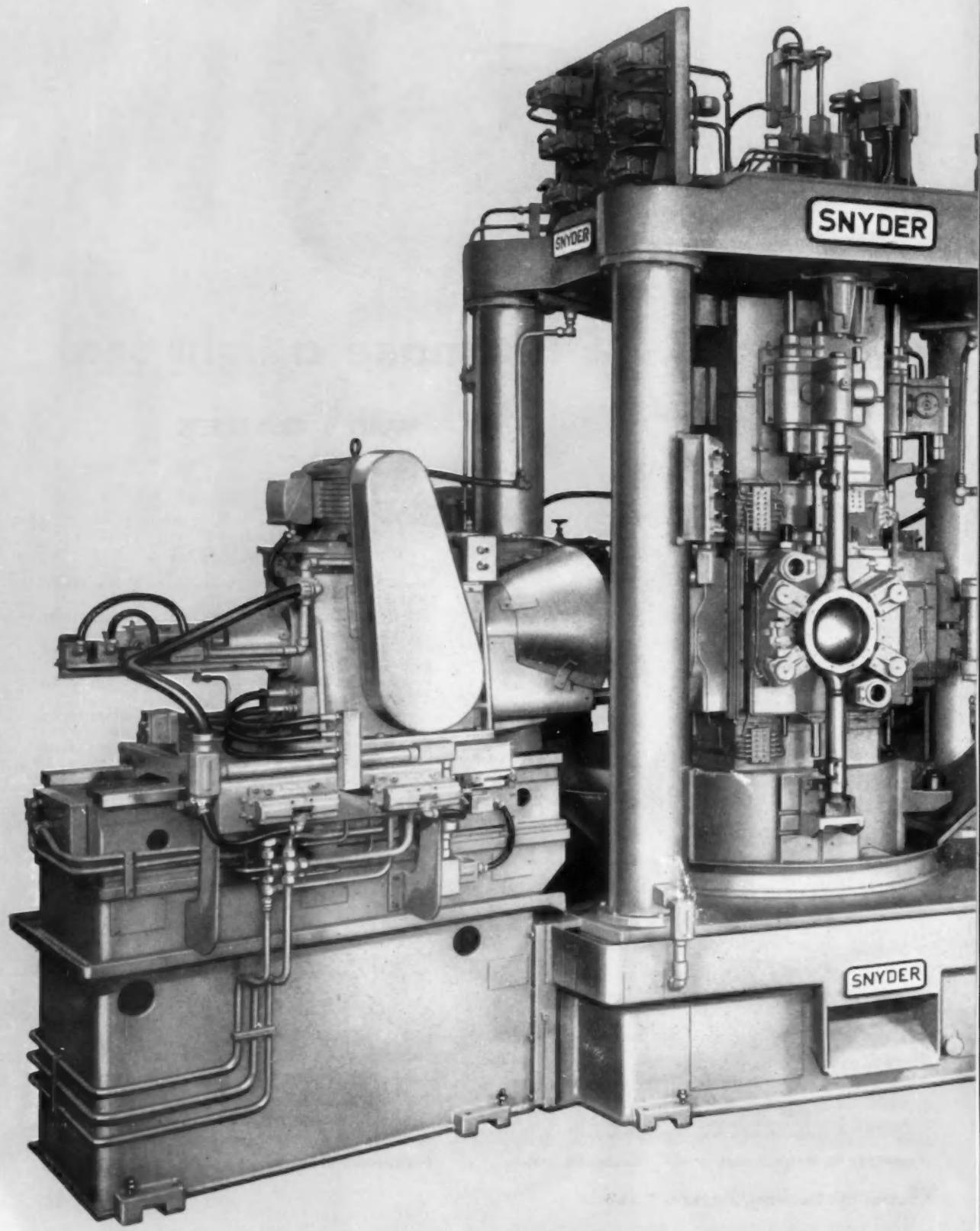


**DEWEY AND ALMY  
CHEMICAL COMPANY**

DIVISION OF W. R. GRACE & CO.



San Leandro, California • Montreal 32, Canada



## **SNYDER VERTICAL TRUNNION MACHINE**

**for processing rear axle housing assembly; rough and finish faces banjo face, combination drills and reams ten holes in banjo face and chamfers both sides of holes. Production: 105 pieces an hour at 100% efficiency.**



# **SNYDER**

**TOOL & ENGINEERING COMPANY  
3400 E. LAFAYETTE • DETROIT 7, MICHIGAN**

*31 Years of Special Machine Tools with Automation*

# BEHIND THE MAN FROM TAYLOR-WINFIELD

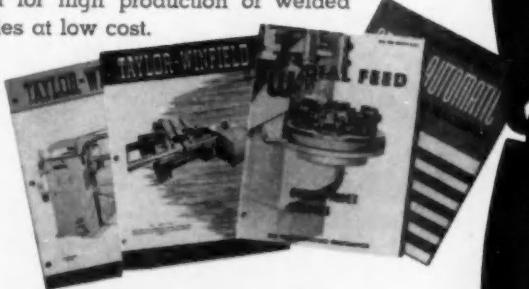
## WELDING TECHNIQUES

T-W recommended practices for basic types of resistance welding on a wide range of metals.



## WELDING MACHINES

Field-proven standard and special welders designed for high production of welded assemblies at low cost.



## PRODUCTION ANALYSIS

Special experiments in T-W Laboratory determine best welding technique, production equipment and practical design for your product.



*The* **TAYLOR-WINFIELD Corporation**  
WARREN, OHIO



### ELECTRIC RESISTANCE AND ARC WELDING MACHINES

Sales and Service

CHARLOTTE • CHATTANOOGA • CHICAGO • CLEVELAND • DALLAS  
DAYTON • DENVER • DETROIT • LOS ANGELES • PHILADELPHIA  
PORTLAND, OREGON • SEATTLE • ST. LOUIS • STAMFORD  
OAKVILLE AND WINDSOR, ONTARIO



(Continued from page 61)

Goodyear Tire & Rubber Co. has a production backlog of new 14-in. diam tires in sufficient quantity to satisfy original equipment demands for 1957 cars and to meet anticipated dealer replacement needs. . . . Norris-Thermador Corp. is now producing 14-in. automobile wheels.

\* \* \*

Cessna Aircraft Co. is putting its four-place CH-1A helicopter into commercial production in the near future.

\* \* \*

Outboard, Marine & Manufacturing Co. has changed its name to Outboard Marine Corp. . . . Raymond Rosen Engineering Products, Inc., has changed its corporate name to Tele-Dynamics, Inc.

\* \* \*

Lockheed Aircraft Corp. is using a new hypersonic missile to probe critical problems of the Air Force intercontinental ballistic missile program. . . . Rocketdyne Div. of North American Aviation, Inc., is developing high-thrust rocket propulsion systems for the Air Force ballistic missiles program.

\* \* \*

Marbelette Corp. has registered the name "Maraset" as a new trademark for its line of epoxy resins for plastic tooling and other production purposes in various industries.

\* \* \*

Initial test runs of the new supersonic B-58 bomber are to begin soon.

\* \* \*

Vanadium - Alloys Steel Co. has an expansion program of its Latrobe, Pa., steel mill, which will approximately double the capacity of the entire plant. . . . Republic Steel Corp. plans an \$8 million program for boosting its titanium melting, preparation, forging and laboratory facilities at Canton and Massillon, O.

\* \* \*

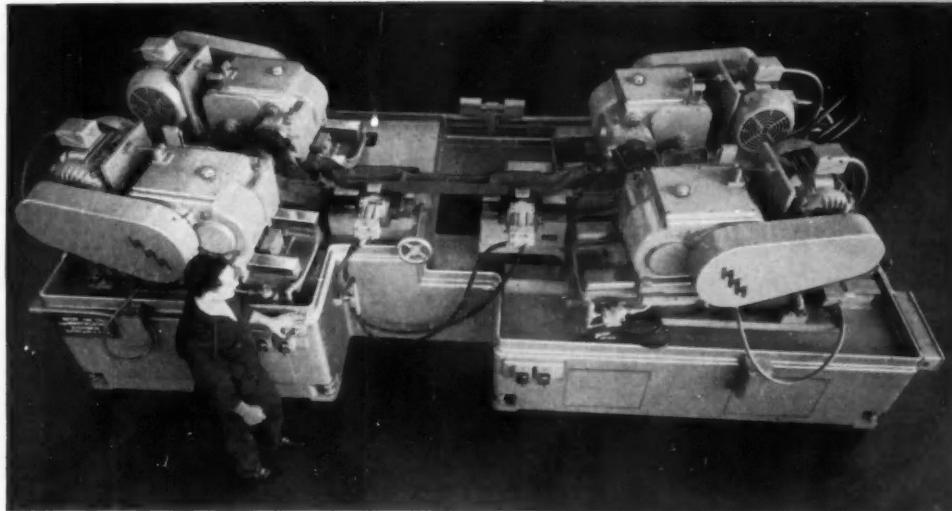
Shallway International Corp. has opened a European Office in Dusseldorf, Germany. . . . Industrial Controls, Inc., has reopened offices at 20939 John R., Hazel Park, Mich.

(Turn to page 224, please)

MIGHTY BIG JOB

MINIMIZED by another

MOTCH & MERRYWEATHER Production Solution

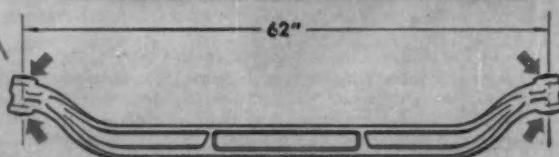


Traveling head universal double duplex milling machine.

Four faces of a part are milled simultaneously by this universal-special machine. Mill faster, more accurately, at less cost with a head for each surface. Motch & Merryweather engineers can design universality into special equipment. Thus, machines performing a specific task can be quickly adapted to a variety of sizes. Have M. & M. study your next job with a view to broadening the usefulness of ostensibly special equipment.

Write for Bulletin S-56 describing  
M. & M. Duplex Milling Machinery.

YOU'RE AHEAD  
WITH A HEAD FOR  
EACH SURFACE



Operation: Milling kingpin bosses of truck axle.  
Material: . . . . . Forged steel.  
Brinell Hardness: . . . . . 217-255.  
Machine cycle time: . . . . . 30 seconds

THE MOTCH & MERRYWEATHER  
MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders of Automatic Precision Cut-off, Milling and Special Machinery

# T-J

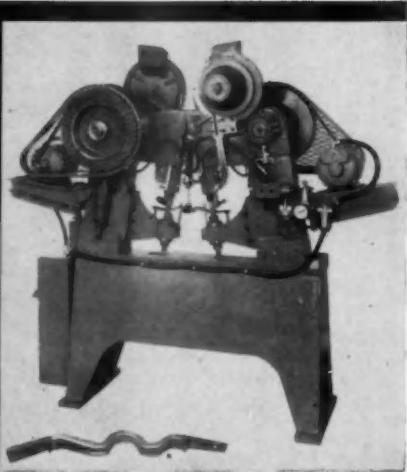
*does your riveting  
and clinching*

## Faster... Automatically!



T-J Clinchers adaptable to a wide range of clinch nut setting problems. Gravity feed model shown here.

### CLINCHORS



This T-J Special Dual Rivitor sets two rivets at a time . . . consists of two 8" throat Model R Rivitors, each with 10" hopper, special oversize anvil post, and special horn. Sample of work shown below machine.

### RIVITORS

*Automatic feeding and setting with T-J Rivitors and Clinchers help you reduce labor and step up SPEED in a wide range of assembly jobs for aircraft, automotive, farm machinery, stampings of all kinds.*

**T-J CLINCHORS** set clinch nuts with fully automatic operation, controlled by a single foot pedal. Available in Underfeed and Gravity feed models, throat depths 8" to 36".

**T-J RIVITORS** automatically feed and set solid rivets with high production. Electrically powered Rivitor sets solid steel rivets up to  $\frac{1}{8}$ " long. Air-powered sets aluminum alloy rivets or steel rivets up to  $\frac{3}{4}$ " long. Throat depths 8" to 36".

Write for Clinchor bulletin 555; Rivitor bulletins 646 and 555.  
The Tomkins-Johnson Co., Jackson, Mich.

**T-J**

**TOMKINS-JOHNSON**

RIVITORS... AIR AND HYDRAULIC CYLINDERS... CUTTERS... CLINCHORS

39 Years Experience



(Continued from page 222)

Exide Industrial Div. of Electric Storage Battery Co. has established a new Silver Battery Div. to produce Exide silver batteries.

Dow Chemical Co.'s gifts to educational institutions will total \$320,000 in the school year beginning next fall.

Republic Aviation Corp. will double the facilities of its Guided Missiles Div.

ElectroData Corp. stockholders voted in favor of consolidation with the Burroughs Corp., Detroit. Shareholders of the Pasadena, Calif., firm will get one Burroughs share for every two held in ElectroData.

Globe Union, Inc., has acquired the assets of Wico Electric Co.

Hamilton Standard Div. of United Aircraft Corp. has launched construction on an addition to its Windsor Locks plant. . . . Shell Chemical Corp. has broken ground for a two-story addition to its technical service laboratory in Union, New Jersey.

Imperial Brass Mfg. Co. has begun construction of a new plant near Chicago.

Queen Stove Works, Inc., Almeo Div., has completed a barrel finishing research and development laboratory located at Albert Lea, Minn.

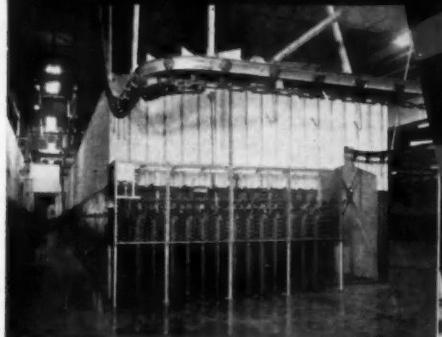
Kent-Moore Organization, Inc. has moved into its new office building at 28635 Mound Rd., Warren, Mich. . . . Fairbanks, Morse & Co. has moved its Milwaukee branch office and warehouse to 1630 S. 38th St.

Dow Chemical Co. has formed an Eastern Research Laboratory at Framingham, Mass. . . . International Business Machines Corp. will construct a laboratory in Kingston, N. Y., for the Military Products Div.

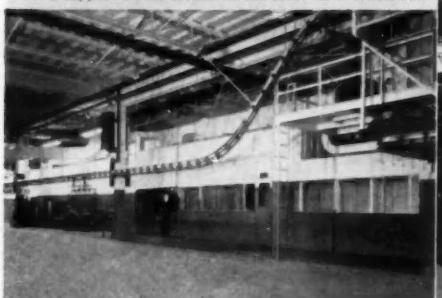
(Turn to page 228, please)

# COMPLETE Finishing SYSTEMS

... for ENAMELS • LACQUER • PAINT • VARNISH



Exterior view of Ventilated Active Drip Zone. Clean, Filtered Air is Supplied to this enclosure. Fume-laden air is exhausted.



View showing glass in one side of Inactive Drip Zone where parts may be seen prior to entering Baking Oven.

... the EXPERIENCE that goes  
into the PLANNING and ENGINEERING  
of MAHON EQUIPMENT is the Item of  
GREATEST VALUE to YOU!

View of Mahon Flow-Coating Equipment at Chrysler Corporation of Canada, Limited.  
This is part of a Complete Mahon Finishing System for Coating Black Enamel Parts.



View of Mahon 450° Enamel Baking Oven. Oven is built against ceiling trusses to provide parts storage space below.



Another view of the Enamel Baking Oven. Finish is baked for 20 minutes at 450° in this 80 Ft. x 24 Ft. Mahon Oven.

## Black Enamel Parts at CHRYSLER CORPORATION OF CANADA, LIMITED, are FLOW-COATED in MAHON FINISHING SYSTEM!

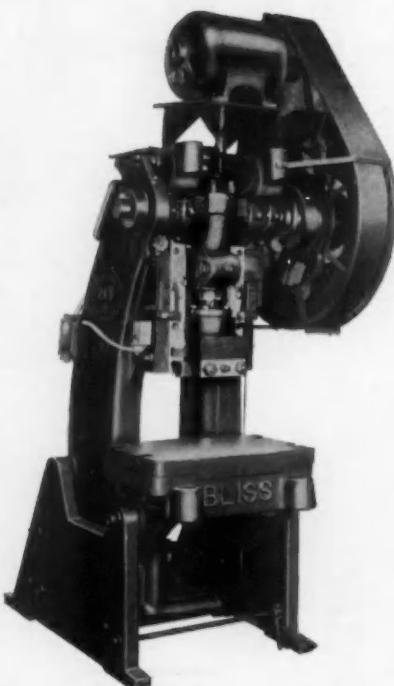
In addition to the body finishing system at the Windsor plant of Chrysler Corporation of Canada, Limited, Mahon also installed a complete finishing system for black enamel parts. This is a Flow-Coating System which includes a Mahon Flow-Coating Machine, a Ventilated Active Drip Zone, a Ventilated Inactive Drip Zone, and a 450° Finish Baking Oven with storage space below. Two Enamel Mixing Tanks and a Solvent Tank are provided outside the enclosure. The recirculating unit is equipped to automatically maintain the enamel at a specific temperature in the Flow-Coating Chamber. This is a typical Mahon Flow-Coating System, complete in every detail—automatic from start to stop. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether your job is to be Flow-Coated, Dip-Coated, or Spray Painted either Manually or by Electrostatic Process, you will find that Mahon equipment will serve you better, because it is engineered better and built better for more economical operation over a longer period of time. Mahon will do a complete job for you on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which can upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656.

**THE R. C. MAHON COMPANY • Detroit 34, Michigan**  
SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

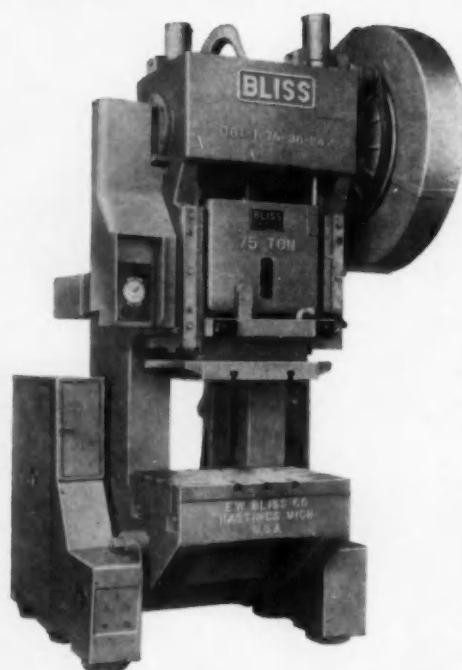
Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

# MAHON

# Bliss inclinables offer you a wider



Standard Inclinable Presses—as furnished in the 10 to 125 ton range. No. 21-S press, 45 ton capacity, shown here.



Enclosed Inclinable Presses—75 to 200 tons. A 75-ton capacity model is shown here.

## More standard types

Bliss builds 23 standard inclinables—open-back inclinables, JIC inclinables, hydraulic inclinables, double-crank inclinables . . . offers a wider range of capacities and bed areas than any other make.

## More standard clutches

The Bliss Positive rolling key clutch and a choice of Bliss crankshaft or driveshaft mounted air friction clutches have been proved on thousands of presses. Bliss has the type of clutch best suited to your work.

## More standard feeds

Bliss designs and manufactures its own line of roll and dial feeds. This single responsibility for both presses and feeds is the press user's assurance that feeds are easily installed and easily adjusted.

## More standard cushions

Five different types of cushions, in a range of sizes that meet every need, make any Bliss inclinable a double-action press. Cushions are especially designed for the press, and the presses designed to receive them—either assembled to press before shipment or easily installed years later.

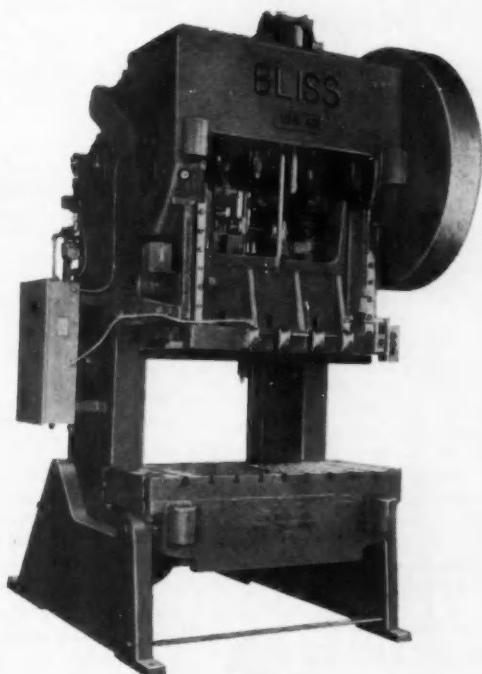
## ... And a million dollar parts and service program to protect your investment!

Because Bliss mass-produces its inclinables, maintaining a stock-pile of spare parts is a simple matter. The million-dollar inventory of spare parts of Bliss' inclinable plant is by far the largest in the industry and includes clutch plates and parts, shafts, gears, pinions and the like. Moreover, Bliss maintains a separate, specially-trained organization whose sole purpose is to service your spare parts needs as quickly as possible.

# choice of standard types and sizes



Standard Enclosed Inclinable as furnished in 150 and 200 ton sizes. No. 29, 150-ton capacity, is shown above.



Double-crank Inclinable Presses—from 18 to 175 tons. No. 108, of 100 tons capacity, is shown here.

## A few of the reasons why BLISS inclinables outsell all other makes ... and always have

- Cast Meehanite frame—stronger, tougher. Fine grain structure dampens noise and vibration.
- Clutches—whose design has been proved by the thousands now in use.
- Gibs are close fitting, extra long, and insure accurate slide alignment at all points in the stroke. Simple to adjust so that original accuracy can always be maintained.
- Choice of hand, semi-automatic or automatic lubrication.



### **NEW catalogs now available**

**32 pages**—describes frames, feeds, clutches, cushions and complete line of open back and enclosed single-crank inclinable presses. Gives dimensions and specifications. Catalog No. 2-D.

**12 pages**—describes these versatile extra-width double-crank presses. Gives dimensions and specifications for entire line. Catalog No. 3.



*BLISS is more than a name... it's a guarantee!*

**E. W. BLISS COMPANY, Canton, Ohio**

*Presses, Rolling Mills, Special Machinery*

*U. S. Plants in Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; San Jose, California; Midland and Pittsburgh, Pa. Branch offices in Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Pittsburgh, Philadelphia, Rochester, Salem, San Jose, Toledo, Washington, D. C., and Toronto, Canada; E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co. (Paris), France. Other representatives throughout the world.*

**AIR-HYDRAULICS**

**A NEW PRESS FOR LESS  
15 TON—AIR HYDRAULIC**

- Durable
- Lightweight
- Compact

**Model C-500.** A versatile press with 8½ inch throat, 6 inch stroke, 2 inch adjustment, equalized pressure full length whether feather-touch or full blow. 100 pound air line gets up to 21 tons delivery. Stand or bench installation. Moving parts protected in handsome housing. Adjustable speeds. Hand, foot or automatic controls. Simple, tireless and safe operation. Women like it. Long, trouble-free service. Easy to maintain and repair. For all kinds of materials. Thickness no problem. Rivets, flanges, brackets, stakes, crimps. Many other uses.

WRITE TODAY FOR INFORMATION REGARDING APPLICATION TO YOUR JOB . . . AND HOW LITTLE IT WILL COST YOU.



**AIR-HYDRAULICS**

**DOUBLE ACTING • ADJUSTABLE  
AIR PRESSES**

PRECISION HONED  
WITH CUSHIONED  
CYLINDERS  
TWO FAST  
ACTING MODELS



For fast and steady small assembly work • riveting • punching • marking • staking. Equalized ram pressure in excess of 1 ton and ½ ton from 90 pound line. Double action gives lifting power almost matching ram pressure. Maintenance reduced by using "O" ring seals and bronze ram bushings. Head fully adjusts for proper stroke length and accurate die-setting. Extra heavy ram guide.

FOR LOW COST APPLICATION TO YOUR JOB — WRITE

**AIR-HYDRAULICS**

**204 BELDEN ROAD  
JACKSON, MICHIGAN**

# A TABLOID

(Continued from page 224)

New York Air Brake Co. has acquired Optical Film Engineering Co., Philadelphia makers of oil diffusion pumps. . . . Bendix-Westinghouse Automotive Air Brake Co. is said to be planning to acquire the business and assets of Brunner Manufacturing Co.

\* \* \*

Caterpillar Tractor Co. is offering tubeless tires as standard equipment for many of its wheel-type earthmoving machines.

\* \* \*

Fairchild Engine & Airplane Corp. has reported that new orders totaling \$90 million have brought its backlog to well over \$200 million.

\* \* \*

Wall Colmonoy Corp. has completed its new plant for production of hard-facing alloys at 19345 John R St., Detroit 3, Mich.

\* \* \*

Pyroil Co. has purchased the stock of Champion Laboratories, Inc.

\* \* \*

Westinghouse Electric Corp. has developed a new alloy called Niveo that functions at temperatures up to 1200 F. Composed principally of nickel and cobalt, it will initially be used in steam turbine blades, but compressors in jet engines are said to be a feature possibility.

\* \* \*

Components Div. of Servomechanisms, Inc., has changed its name to Mechatrol Div.

\* \* \*

Kaman Aircraft Corp., the Navy, and the Army have developed a remotely controlled helicopter.

\* \* \*

Armour Research Foundation of Illinois Institute of Technology is now operating the nation's first private nuclear reactor for industrial research.

\* \* \*

First fleet deliveries of the new Martin SeaMaster multi-jet seaplane are expected to start in the early fall of 1958.



**FOR LARGE OIL SEALS  
IN SMALL QUANTITIES  
AT THE LOWEST COST SEE**

**Universal**

Universal's unique manufacturing method which eliminates tooling charges for unusually large diameter oil seals is ideal for experimental and small quantity orders.

Precision-built to give long, efficient, trouble-free service—all Universal Oil Seals specially engineered for floatability, self-alignment and automatic take-up.

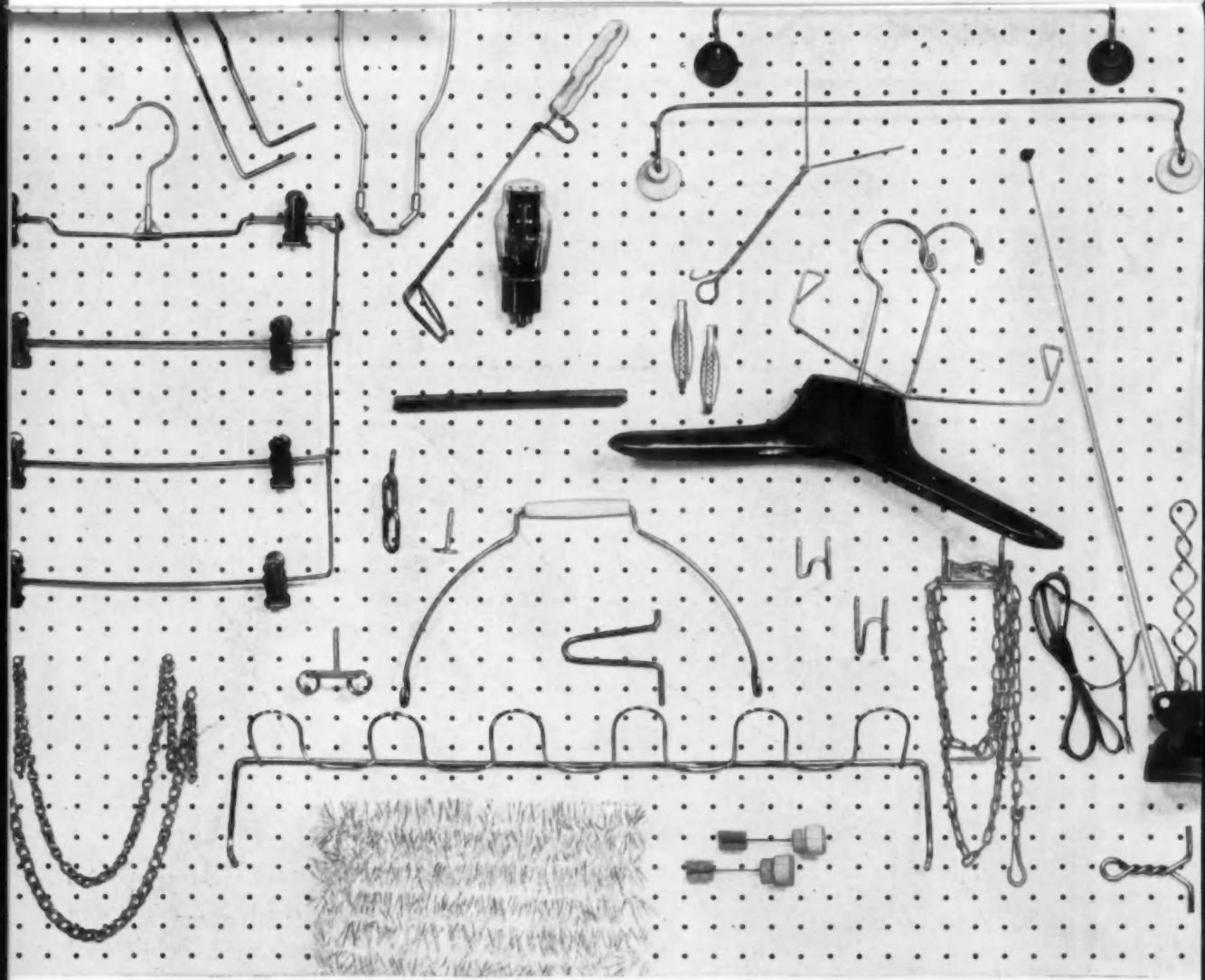
*Oil seals for every purpose!*



**UNIVERSAL  
OIL SEAL CO.**

**P.O. BOX 74  
PONTIAC, MICH.**





How these products were improved and costs lowered . . .

with **NICKELPLY\***, **BRASSPLY\*** and **COPPERPLY\*** wire!

• National-Standard Nickelply, Brassply and Copperply is electro-jacketed steel wire—a new development offering important advantages to manufacturers and users of wire forms and components. Specifically . . .

The jacket metal, precisely concentric and to the required thickness, is inseparably bonded to the steel wire. The materials can be severely formed, twisted, swaged, welded, roll threaded or redrawn without fracturing the jacket metal or otherwise exposing the base metal. Thus these new materials can often replace solid nickel, brass

or copper wire, or can eliminate the costly post-plating of steel wire forms . . . and with unmatched assurance of coating coverage! Advantages in strength, durability and economy are obvious.

Nickelply, Brassply and Copperply are now available commercially in diameters up to .340". Pertinent data on coating weights, strengths, finishes, base materials, corrosion resistance, etc., are given in Bulletin K-10. Why not send for it now and explore these new possibilities?

\*Trade Mark National-Standard Company

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN  
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.  
Flat, High Carbon, Cold Rolled Spring Steel

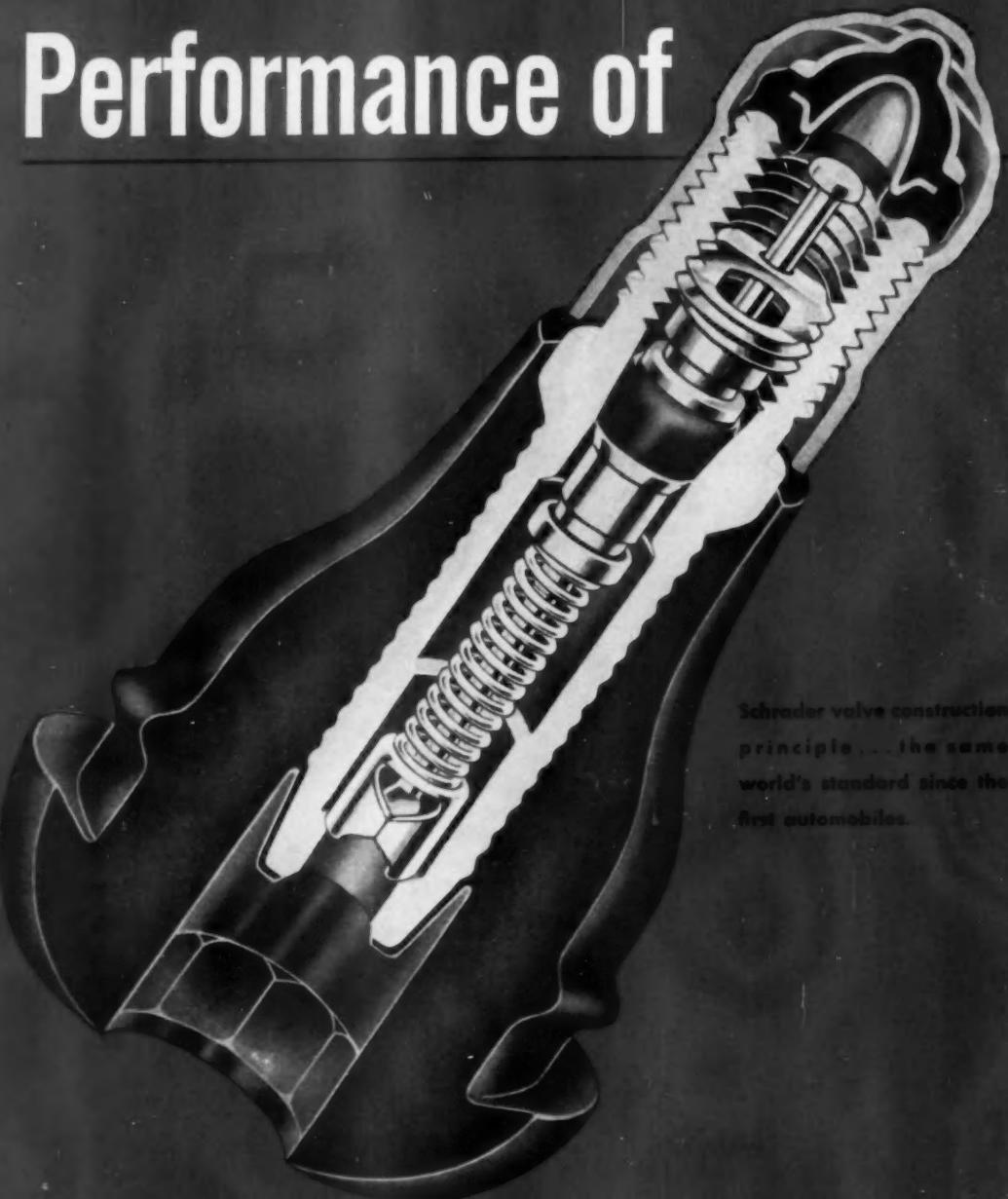
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS  
Industrial Wire Cloth



WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.  
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.  
Round and Shaped Steel Wire, Small Sizes

# Performance of



Schrader valve construction principle...the same world's standard since the first automobiles.

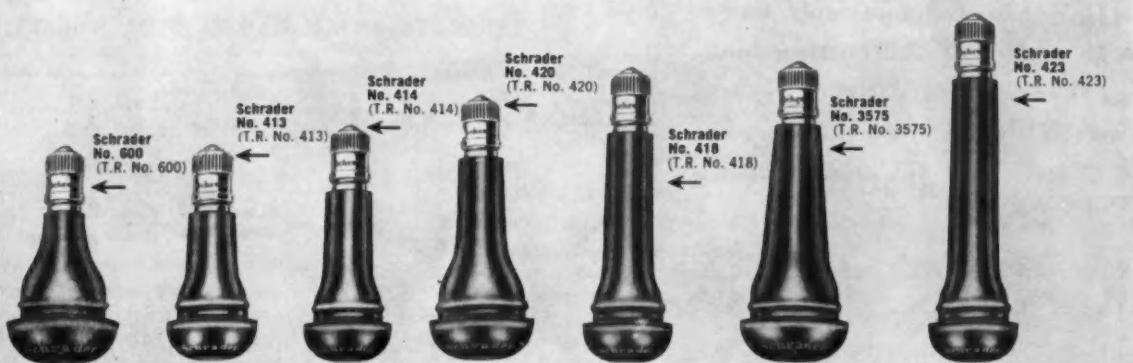
**Schrader®**  
ESTABLISHED IN 1844

# Schrader valves on new Tubeless-Equipped vehicles is the *best ever!*

With the giant swing to tubeless, Schrader Valves make maintenance and service simpler than ever, *regardless* of vehicle requirements. Schrader Valves become one with the rim . . . seal air as securely as the tire itself. The standard "long-core" principle engineered by Schrader half a century ago is unequalled for effective sealing. As the leading air products supplier to the industry, Schrader works with manufacturers to meet specific needs . . . keeps abreast with full lines . . . provides service, tools, parts and information wherever your product goes.

You can count on Schrader for latest tubeless tire valve design, developments, and above all . . . *performance!*

## THESE ARE SOME OF THE NEWEST E-Z-E MOUNT TUBELESS VALVES AND THE LATEST VALVE PRACTICE



A. SCHRADER'S SON • Division of Scovill Manufacturing Company, Incorporated • 470 Vanderbilt Avenue, Brooklyn 38, N. Y.

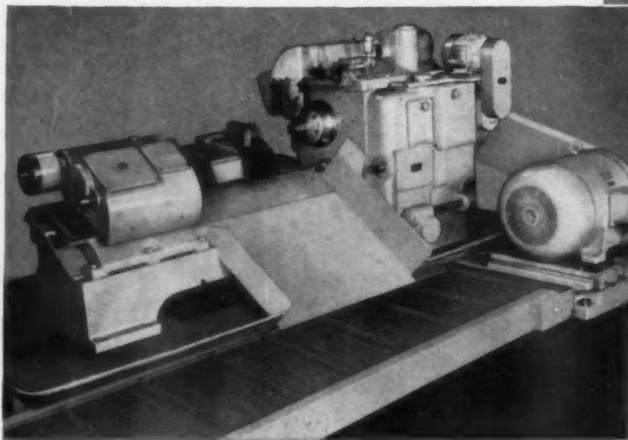
FIRST NAME IN TIRE VALVES

FOR ORIGINAL EQUIPMENT AND REPLACEMENT

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

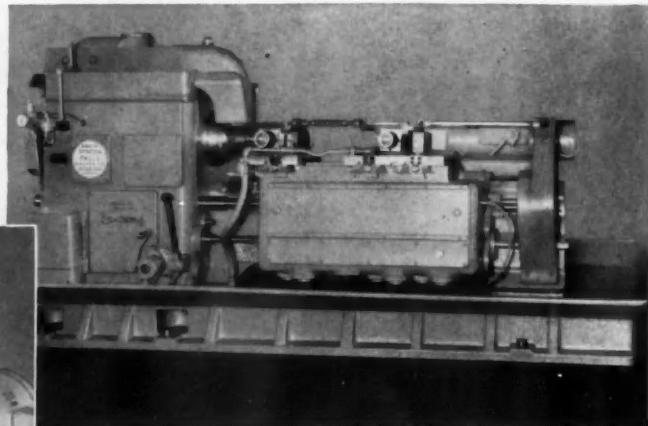
## NEW SENECA FALLS DESIGN SOLVES CHIP DISPOSAL PROBLEM



**PROBLEM:** To eliminate machine down time due to chip accumulation in the tooling area and pan of lathes required for a high production rear axle shaft job.

**SOLUTION:** To promote rapid flow of chips from the edges of the cutting tools, Seneca Falls engineers designed a special "Chip Flow" type bed for the otherwise standard Model AR Automatic Lo-swing Lathe.

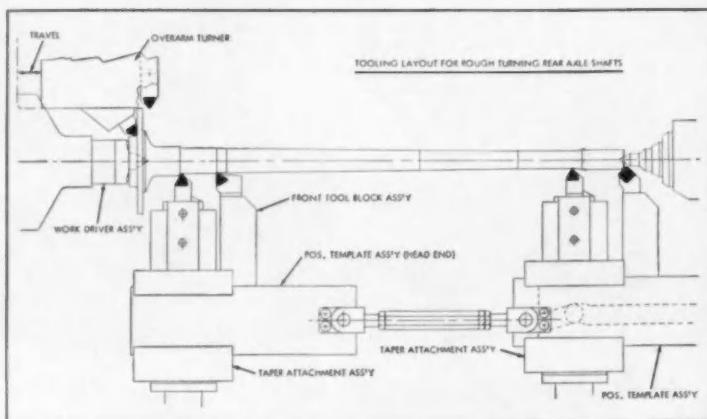
The rear view illustration shows that the usual back shelf has been eliminated in the chip area and replaced with a smooth, steep angle slope which assures an uninterrupted flow of chips from the edges of the cutting tools into the mechanized



chip conveyor at the base of the machine. Auxiliary attachments are mounted overhead instead of on the usual back shelf. An auxiliary, cam-operated turning slide mounted on the headstock is used for turning the outside and pilot diameters of the shafts. Facing slides can be supplied to replace this attachment.

High spindle speeds and coarse turning feeds assure a production of 153 shafts per hour with Automatic Work Handling Equipment.

**SENECA FALLS MACHINE CO., SENECA FALLS, N.Y.**



**PROFIT ENGINEERED BY SENECA FALLS**

## Industry News

(Continued from page 63)

### More Powerful Wolseley Car Is Introduced by Nuffield

The Nuffield Organization has introduced a new 1550 Wolseley 1550 sedan powered by a B.M.C. ohv. engine of 90.88 cu. in. displacement which produces 50 bhp. at 4200 rpm. It is equipped with a centrally-placed gear shift instead of the steering column version.

Comfortable riding qualities and excellent road holding are said to be insured by independent front suspension, semi-elliptic rear springs and telescopic hydraulic rear dampers with anti-sway mounting.



#### TORN-DOWN TEST CARS

Shown here is an automotive jigsaw puzzle with thousands of pieces which results from General Motors' annual tests conducted at the GM Proving Grounds to check the durability of GM and competitive make cars. The cars are driven 25,000 miles over a rugged course near Milford, Mich. They are then torn down, piece by piece, to measure wear. After the engineers get through with their micrometers, there's the job of re-assembling the cars literally from the "ground up."

#### Aluminum Prices Up One Cent Per Pound

The one-cent per pound increase in price of aluminum announced last month by aluminum companies following agreement on new contracts with the union is not expected to reflect much, if any, in the price of 1957 automobiles.

While the increase per ton on aluminum is actually larger than increases made in the price of steel, car makers could absorb it because a relatively small amount of aluminum is

used on cars. Although admittedly the amount of aluminum in automobiles has been increasing in the past few years, the average car today uses only about 35 lb of the metal. Manufacturing costs for anodizing aluminum, however, could add to the overall price of a car.

Aluminum Co. of America was the first company to announce a price boost. The new price for aluminum pig is 25 cents a pound, with other aluminum products marked up by varying amounts. Reynolds Metals Co. and Kaiser Aluminum & Chemical Sales, Inc., followed with similar hikes immediately after agreements on new contracts which contain benefits to employees approximating 46 cents an hour over a three-year period.

Meanwhile, to offset the increase in labor costs resulting from concessions granted to steel workers, most steel companies have started revising their prices upward in line with the increase made by U. S. Steel Corp., which hiked its products an average of \$8.50 a ton. Other companies which quickly followed U. S. Steel's price pattern include Inland Steel Co., Republic Steel Corp., and Bliss & Laughlin, Inc.

#### Further Expansion Planned For Titanium Metals Plant

Further expansion of facilities for production of titanium sponge at the Titanium Metals Corp. of America plant in Henderson, Nev., is planned by the National Lead Co. and Allegheny Ludlum Steel Corp., co-owners of the Nevada firm. When the expansion is completed, capacity for producing titanium sponge will be increased to 25 tons a day from 16.7 tons.

In addition, production capacity for titanium ingots will be upped from the present 17 tons a day to 30 tons.

#### Station Wagon Boom Seen Shifting West

While station wagon sales continue to increase in all areas of the country, the largest concentration seems to be shifting to the West Coast. Chevrolet notes that Pacific Coast buyers now are accounting for one out of every five station wagons produced by the division.

Two years ago, the Atlantic Coast represented Chevrolet's biggest market for station wagons. Gains also are being registered in the midwest and southwest areas.



### HOW DOES GARRETT GIVE SUCH SERVICE?

What others may call impossible Garrett comes through as routine service. It seems as though they treat each order as the only one in their three plants. Everybody pitches in for service with the customer in mind.

If it is a stock item such as lock washers, flat washers, spring washers or hose clamps the order is usually on the way the same day. If it is stampings or assemblies Garrett engineers, production men and die makers team up to make their high-speed automatic equipment really hum . . . and your order is in your hands in half the time.

Want to be surprised by real service you can't beat? Next time send your order to Garrett for . . .

**LOCK WASHERS  
FLAT WASHERS  
HOSE CLAMPS  
SPRING WASHERS  
STAMPINGS**

*Manufactured by*

**GEORGE K. GARRETT CO., Inc.**  
Philadelphia 34, Pa.

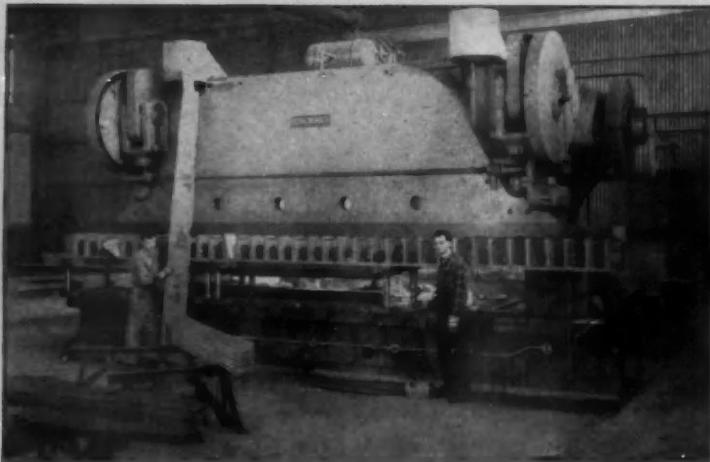


# 70 minutes cut on combined blanking and punching operations!

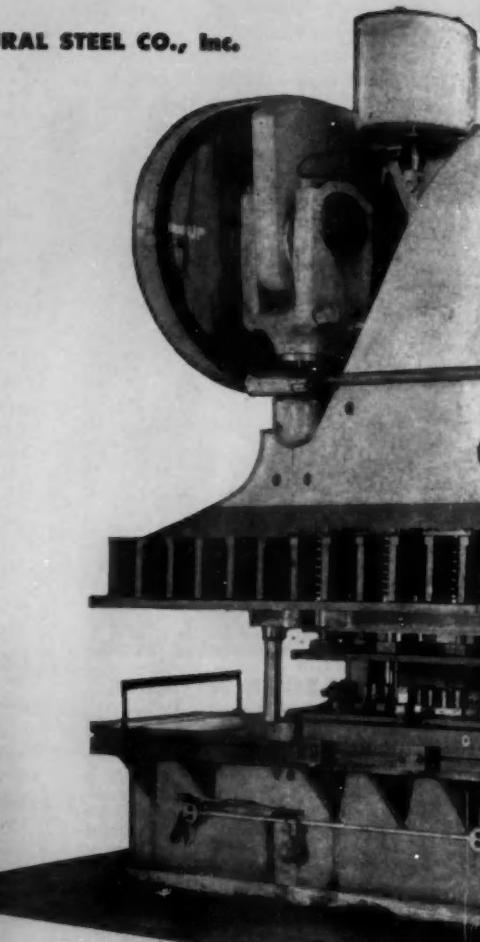
—FORT WAYNE STRUCTURAL STEEL CO., Inc.  
Fort Wayne, Ind.

This versatile Cincinnati All-Steel Press Brake, 34 Series x 16', has revolutionized the production of these long motor truck side rail reinforcements.

Check with our die engineering department on the application of a versatile Cincinnati All-Steel Press Brake in your shop. It can sharply reduce your production costs.



(A) Blanking floor to floor time 1½ minutes.  
Previous time 34 minutes.



(B) Note Fort Wayne's ingenious punching equipment which reduced punching time from 36 minutes to 1½ minutes and took advantage of every versatile Cincinnati feature.

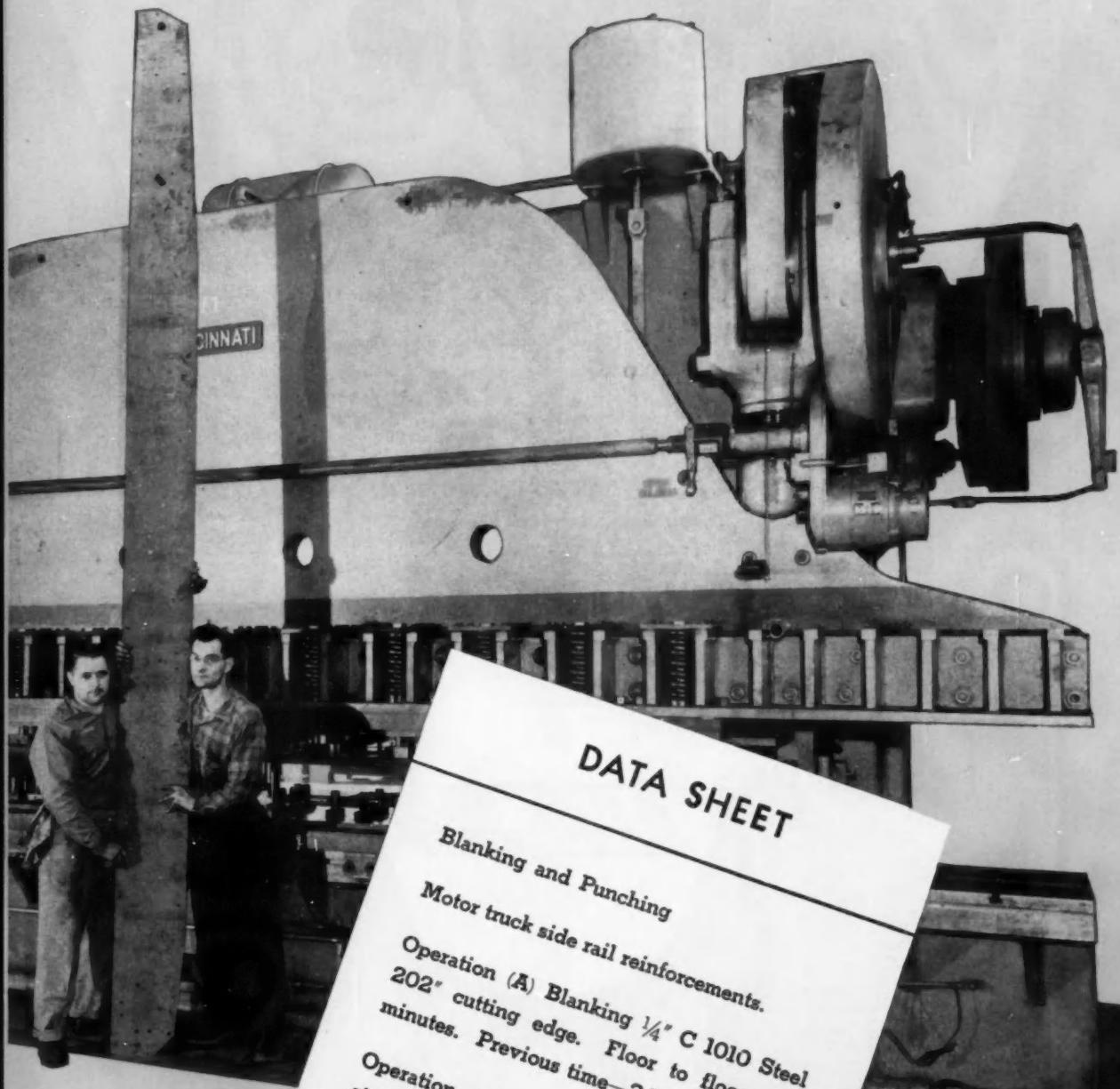


## THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

# to 2.6 minutes...



## DATA SHEET

Blanking and Punching

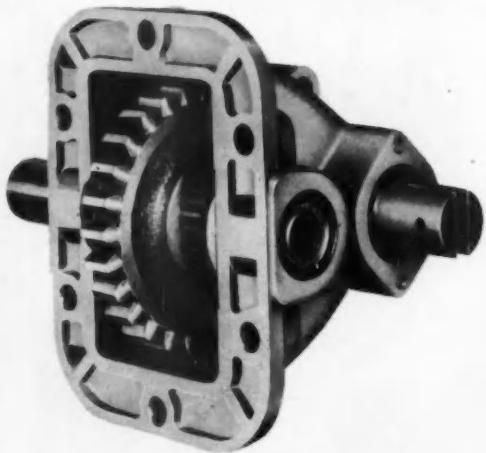
Motor truck side rail reinforcements.

Operation (A) Blanking  $\frac{1}{4}$ " C 1010 Steel  
202" cutting edge. Floor to floor— $1\frac{1}{4}$   
minutes. Previous time—34 minutes.

Operation (B) Punching 130 holes per  
stroke. Floor to floor— $1\frac{1}{3}$  minutes. Previ-  
ous time—36 minutes.

*John L. Hayman*  
President

Photos Courtesy—  
**FORT WAYNE**  
**STRUCTURAL STEEL CO., Inc.**  
Fort Wayne, Indiana



### series 22 tulsa<sub>®</sub> power take-off

A shining example of Tulsa Winch engineering and manufacturing skill is the new single speed, medium duty

Tulsa Power Take-Off. Check these advantages:

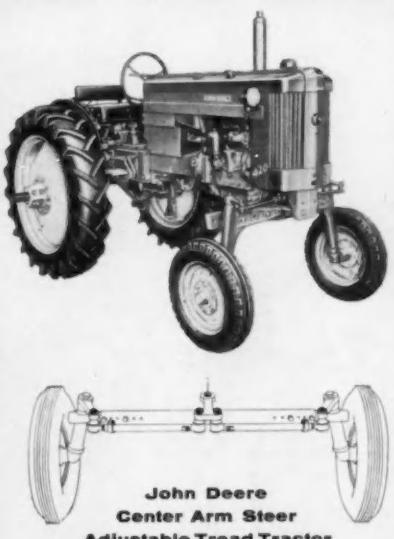
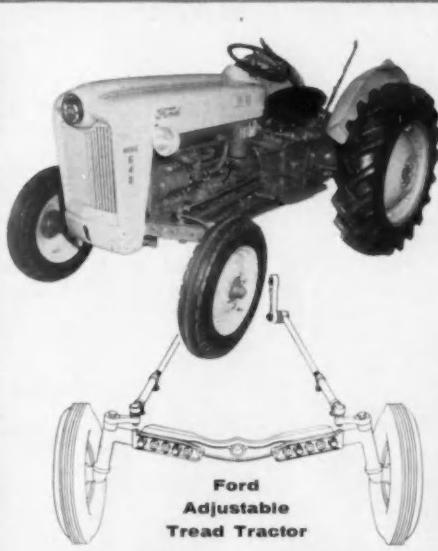
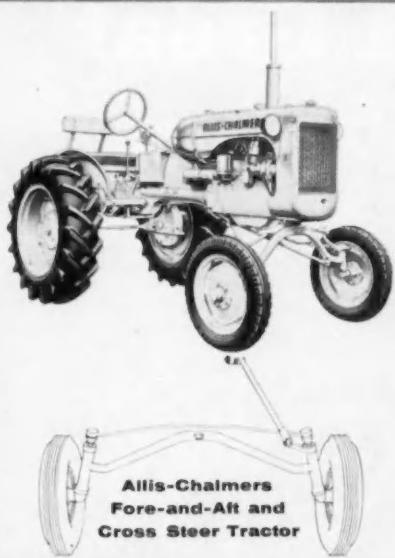
- Lightweight, die-cast aluminum housing . . . out-
- put shaft rotates on two needle bearings
- . . . cable or lever control . . . three out-
- put shaft sizes available. This new
- "Series 22" Tulsa Power Take-
- Off is the newest addition to
- the complete Tulsa line
- highest quality,
- nationwide dis-
- tribution and
- service.

in the

spotlight

**Tulsa Winch**  
TULSA, OKLAHOMA DIVISION OF VICKERS INC.





## Leading farm tractor makers look to Thompson for better, efficient steering

LEADING farm equipment manufacturers use Thompson Products for their steering linkage requirements. New uses for farm machinery, the farmer's desire for easier steering, new designs, and other important developments . . . all have necessitated better and more complicated steering systems. Thompson engineers have worked hand-in-hand with manufacturers to provide the varied steering linkage necessary for modern farm machinery.

Thompson has an abundance of engineering skills, development facilities and production capacities ready to go to work for you. Why not talk over *your* problems with the people at Thompson. Write or call Michigan Division, Thompson Products, Inc., 7881 Conant Avenue, Detroit.

# Thompson Products

MICHIGAN DIVISION  
DETROIT AND PORTLAND

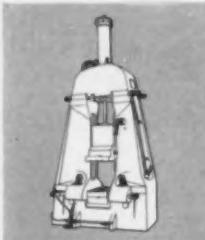
You can count on

# A Great Team

• in any forge shop



Photo courtesy Bonney Forge & Tool Works



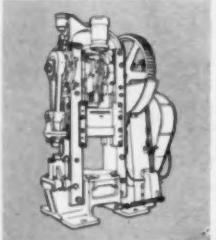
## CHAMBERSBURG CECO-DROP

- Piston-lift • Gravity drop
- Costs less to operate
- Forges more minutes per hour
- Forgings made faster
- Operation is easier and safer
- Maintenance is cheaper
- Full stroke or short stroke without interruption
- Over 400 in service in over 100 forge shops

## Ceco-Drop and Trimmer • for top production

When the chips are down, it is continuous, trouble-free, quality production that puts you ahead of competition. That fact explains why the Ceco-Drop (in combination with the "indestructible" Chambersburg Trimmer) has become in nine short years, the standard gravity drop hammer of the forging industry.

Write for descriptive Bulletins



## CHAMBERSBURG FORGED STEEL SLIDE TRIMMING PRESS

- Exceptional strength
- Jam-proof. Functions perfectly after stall-test
- Uses minimum floor space
- Accessible front and back
- Friction-slip Flywheel
- Interlocking forged steel side construction
- Low power consumption
- Safe
- Single or Double Crank

CHAMBERSBURG ENGINEERING COMPANY  
CHAMBERSBURG PENNSYLVANIA

— ALSO BUILDERS OF THE IMPACTER —

# **FEDERAL WELDING PRESS . . .**

## **a complete seat frame with every press stroke!**

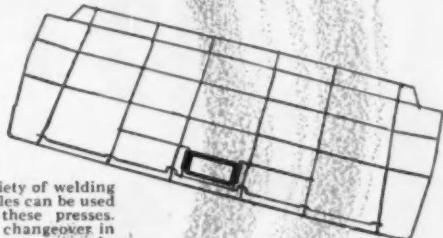
Frames for automobile seat backs and cushions are being resistance welded on Federal Welding Presses at the Great Lakes Spring Division of Rockwell Spring and Axle Co.

Only Federal can offer single company responsibility in supplying both the mechanical welding press and the welder tooling based on their long experience in both press (Warco) and resistance welder (Federal) manufacture.

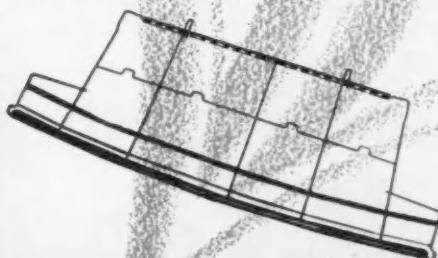
There are many manufacturing operations existing today where a mechanical welding press would pay dividends. If you have one of them, why not contact the one company best suited to provide the answer? That's *Federal — First in Resistance Welding*. Welding Press brochure on request.



Close-up view of welding capsule.



A variety of welding capsules can be used with these presses. For a changeover in product, simply change the tooling.



There's no comparison between the old single weld method and this "automated" production line made possible through the Federal Welding Press.

**federal**  
WELDERS®

9967

**The Federal Machine and Welder Company**  
WARREN, OHIO

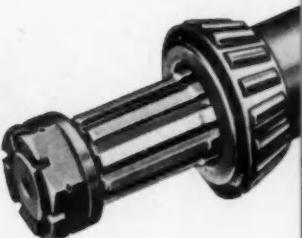
**Warco**  
PRESSES®

*The turnaround that made possible a new tool*

# the new TDA®

## WIDE RANGE®

# 2-speed axle



**A new member of the famous  
TDA 2-speed axle family**



for application of automotive power...



for operations  
requiring  
short transmission  
steps and high  
over-all gear  
reduction

The new TDA WIDE RANGE 2-Speed Axle (available in both 2 to 1 and 2½ to 1 ratio spreads) offers all the highly desirable advantages heretofore available only through the use of complex multiple-speed transmissions or auxiliary gear boxes, without many of the penalties of either one or the other:

- WITHOUT laborious two-stick shifting.
- WITHOUT wasteful excessive weight.
- WITHOUT increased driver fatigue.
- WITHOUT unusual wheelbase limitations.
- WITHOUT higher initial vehicle cost.
- WITHOUT higher maintenance cost.
- WITHOUT excessive wear on the lower speed gears of the transmission.
- WITHOUT restricted over-all gear reduction.
- WITHOUT complicated shift patterns.

For complete information on the new TDA WIDE RANGE Axles now available, call, wire or write your nearest vehicle dealer or branch.

**Here's the simple switch  
that turned the trick!**

The broader range of the new Timken-Detroit® WIDE RANGE 2-Speed Axle was achieved by a fairly simple mechanical rearrangement. We "flipped" our high-range (1) and low-range (2) helical gear sets—reversed their relative positions—to place the enlarged helical pinion of the high-range gear set where it would not interfere with the hypoid pinion (3) of the first-reduction gear set.

Plants at: Detroit, Michigan • Oshkosh, Wisconsin  
Utica, New York • Ashtabula, Kenton and Newark,  
Ohio • New Castle, Pennsylvania

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**TIMKEN**  
*Detroit*  
**AXLES**

TIMKEN DETROIT AXLE DIVISION  
ROCKWELL SPRING AND AXLE COMPANY  
DETROIT 32, MICHIGAN



**if you make or use  
parts like these—**



\*LUSTERIZED FINISH,  
Patent Applied For

WHY NOT SAVE 50%  
OR MORE AND GET A  
BETTER FINISH WITH  
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TRADE-MARK REGISTERED  
**FINISH**  
**LEDLOY\***  
COLD DRAWN BARS

LEDLOY "A" leaded bar steels give you double the machining rates of C-1117 or similar steels—and 45% to 60% faster than B-1113.

LUSTERIZED FINISH adds a new ingredient of quality to Bliss & Laughlin Cold Drawn Bars which carries through to improve your fabricated parts.

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★ Registered Trade-Mark Inland Steel Company.

**BLISS & LAUGHLIN, INC.**

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IN ALL PRINCIPAL CITIES

In  
American Tractor's  
Terraloaders...



## Webster Hydraulic Pumps for Shock Resistance



Watch the operator of an American Tractor TERRALOADER drive the bucket deep into a pile of rubble . . . see the ease and speed with which the hydraulically operated bucket lifts its brimming load . . . and you can't help but marvel that a piece of equipment can withstand such day-after-day abuse.

One small, but important, factor in Terraloader's fine performance is the WEBSTER Type HC hydraulic pump.

The ability of this pump to resist shock, its speed of response, its compact size and its rugged dependability, make it the ideal unit for such applications.

The Type HC is just one of a complete line of more than 100 WEBSTER hydraulic pumps and motors. Pumps range in capacity from 1/5 to 30 gpm, at pressures up to 1500 psi and speeds to 3600 rpm. Motors range up to 20 hp at 2000 rpm. Select from these the type that fits your needs with full assurance of fine performance and modest cost.

### OIL HYDRAULICS DIVISION

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RACINE



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contains complete information on  
WEBSTER'S complete line of over 100 different  
positive displacement gear-type pumps and  
fluid motors. Write for your free copy today.



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Racine, Wisconsin

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MANUFACTURERS OF A COMPLETE LINE OF OIL HYDRAULIC PUMPS FROM 1/5 TO 30 GPM CAPACITY

# NEW

## ABRASIVE ALUMINUM TREAD PLATE



### Nonskid—light—no rust

Alcoa® Abrasive Tread Plate is a tough aluminum alloy with skidproof aluminum oxide rolled right into the surface. It's so nonskid you can walk right up a 30° incline—even when it's wet or oily!

This tread plate is  $\frac{1}{3}$  the weight of steel. It won't rust. It's easy to fabricate. It comes in many thicknesses and sizes.

Alcoa Abrasive Tread Plate is ideal for factory floors, ladder treads, engine room and pump room platforms, walkways, truck trailers, bus steps and aisles and many other uses. See your Alcoa distributor.

ALWAYS FASTEN ALUMINUM WITH  
ALCOA ALUMINUM FASTENERS

Your Guide to the Best  
in Aluminum Value

THE ALCOA HOUR  
TELEVISION'S FINEST LIVE DRAMA  
ALTERNATE SUNDAY EVENINGS



### GET FREE BOOK ON ALCOA TREAD PLATE, SEND COUPON

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Gentlemen:  
Please send informative 8-page booklet, Alcoa Abrasive Tread Plate.

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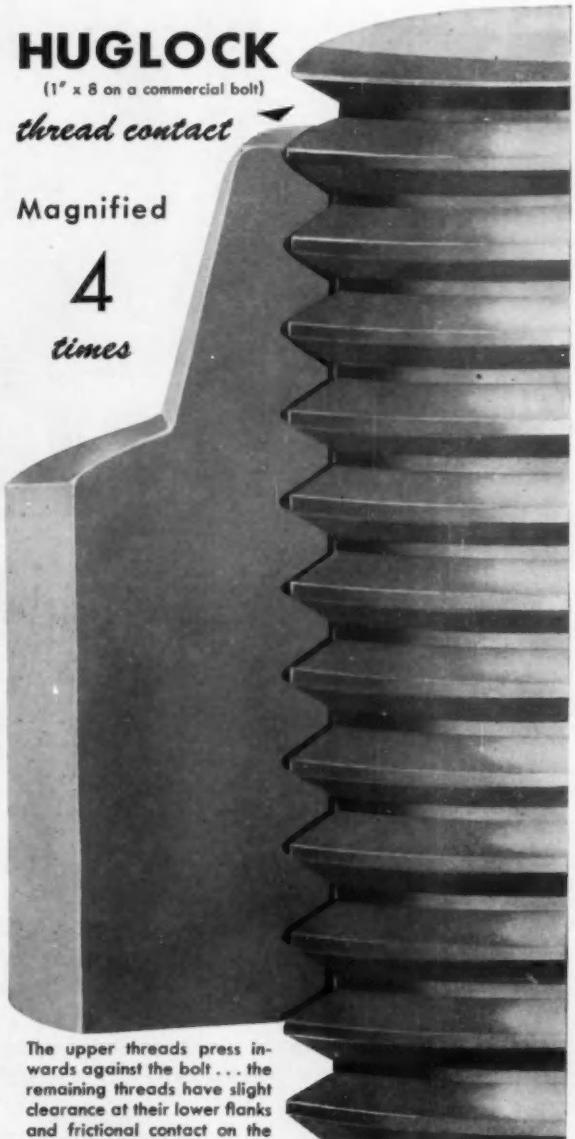
## HUGLOCK

(1" x 8 on a commercial bolt)

thread contact

Magnified

4  
times



The upper threads press inwards against the bolt . . . the remaining threads have slight clearance at their lower flanks and frictional contact on the load carrying flanks.

"HUGLOCK" maintains its locking action through repeated removals . . . locks to the bolt, whether the nut is seated or unseated . . . eliminates axial thread play, which tends to make nuts creep from their seat and work loose, under severe vibration or shock . . . all lock washers, cotter pins, key plates, etc., may be eliminated . . . The "HUGLOCK" section of our new catalog, contains 24 pages, includes engineering data and prices and will be furnished upon request.

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## THE Big Value CUSHION SEAT



For POWER MOWERS,  
LIFT TRUCKS AND  
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"Thrift-King" is a 2-way value seat for manufacturers of lift-trucks, mowers, and many types of medium mobile equipment: it definitely adds "sell;" it definitely improves workability. Full cushion foam rubber seat and full cushion foam rubber back rest assure sustained comfort and operational freedom. Wide choice of covering materials that will withstand outdoor use. Frame is of solid one-piece welded construction for rigorous service; easily attached. Available as illustrated, or with special features engineered to your equipment.

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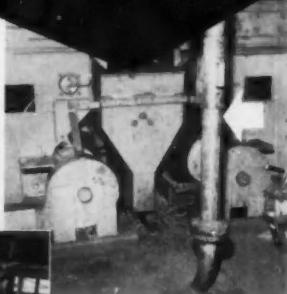
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**HERE'S HELP!**

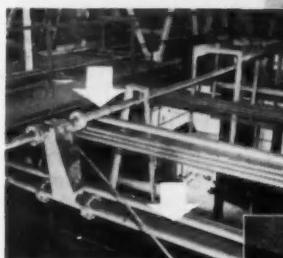
Auto plant CUTS COSTS  
by removing cast iron chips  
AUTOMATICALLY through  
**Hapman TUBULAR  
CONVEYORS**

PICTURES  
TELL THE STORY!

On some machines, short tubular conveyors remove chips from below. This broach has simple chute to guide chips. Conveyor tube then rises vertically, takes chips to ceiling . . .



Chips from vertical risers from many machines discharge into main chip header hung from ceiling; are conveyed outside building . . .



Outside, 450 ft. long main conveyor receives chips from 3 headers in plant and conveys them to briquetting machine . . . all automatically!

IN LARGE OR SMALL PLANTS, Hapman Conveyors pay for themselves with labor savings! They are handling wet and dry metal chips, cast iron dust, welding flux—removing quench tank scale and sludge. Dust and liquid tight, they offer dozens of unique advantages.

CHALLENGE US! See if Hapman engineers can help solve your bulk handling problem! Write for folder describing above installation AND REQUEST HAPMAN BULLETIN G-96.

**NEW!**

Pan-Link Conveyor—For spiral turnings, stampings, castings. Request Bulletin GH-656.

Hi-Lift Cable-veyor-Elevator—For bulk materials. Request Bulletin GH-556.

Wire-Mesh Belt and Pneumatic Conveyors—Request details.

**Hapman CONVEYORS, INC.**

DIVISION HAPMAN-DUTTON COMPANY

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In British Commonwealth & Europe:  
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# R M

FIRST IN FRICTION

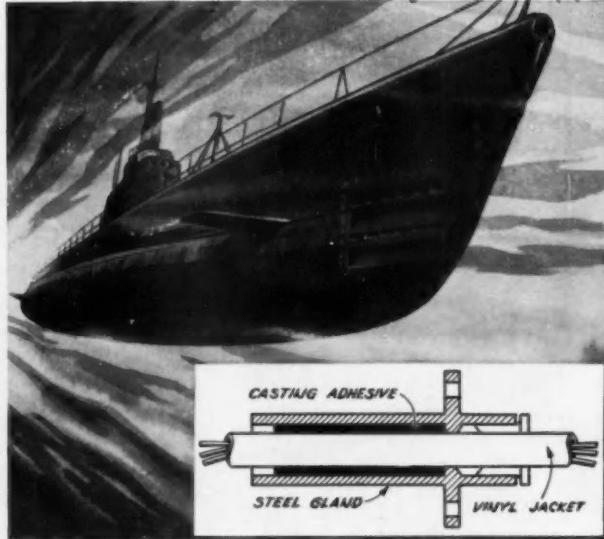


Polyethylene plastic presents a tough bonding problem. R/M helped overcome it in this farm irrigation pipe by recommending one of the new Ray-BOND adhesives to bond the fittings.



This Snow Train travels across frozen Arctic wastes on 1200-mile treks carrying loads from 130 to 175 tons. To overcome low-temperature problems the brake linings are bonded with one of the new R/M adhesives.

## R/M ANNOUNCES OF ADHESIVES,



Ray-BOND adhesive bonds vinyl jacket and steel gland in this submarine cable—protecting against moisture and abrasion and improving dielectric properties.

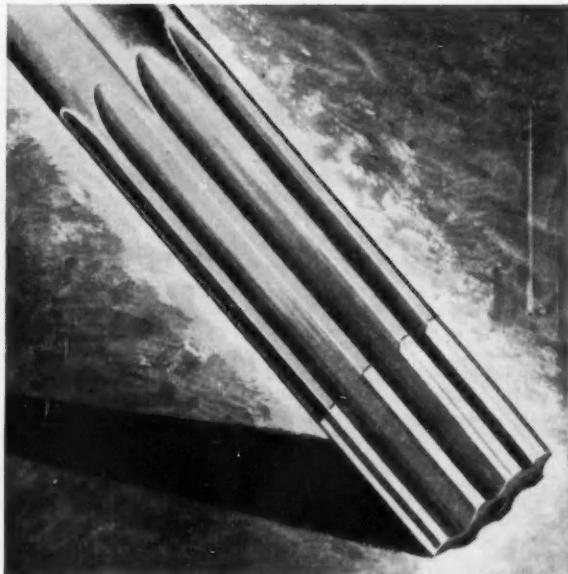


By using Ray-BOND adhesives to bond the metal name plate to the plastic case, an electric razor maker reduced personnel for this operation 75%—because of rapid adhesion and elimination of the pressing operation.

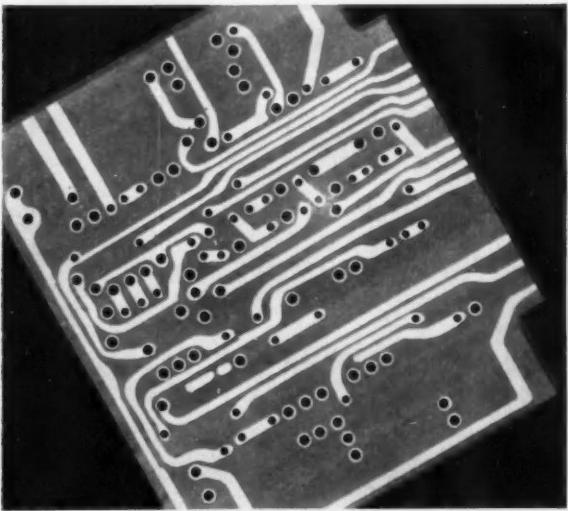
**THE RECORD OF "FIRSTS" IN  
FRICTION MATERIAL DEVELOPMENT  
SHOWS WHY R/M IS  
FIRST IN FRICTION**

FIRST Woven Brake Lining • FIRST Asbestos Brake Lining • FIRST Ground Wearing Surface • FIRST Zinc Alloy Wire Brake Lining • FIRST Pre-Treated Yarns • FIRST Extruded Pulp Brake Lining • FIRST Flexible Pulp Brake Lining in Rolls • FIRST Dry Process Brake Lining • FIRST Semi-Metallic Brake Lining • FIRST Bonded-to-Metal Brake Lining • FIRST Woven Clutch Facings • FIRST Molded Asbestos Clutch Facings for Clutches Operating in Oil • FIRST Endless Woven Clutch Facings • FIRST Pre-Treated Clutch Facings • FIRST Bonded-to-Metal Clutch Facings

# A SPECIALIZED LINE PROTECTIVE COATINGS AND SEALERS



The ceramic tip on this reamer is held strong and rigid by R/M Ray-BOND adhesives.



Ray-BOND adhesives overcome heat and flexural problems on printed circuits.

## New Ray-BOND Products Cut Costs... Simplify Bonding for Wide Range of Materials and Applications

Adhesive bonding today is a well-established technique—with well-known advantages. It eliminates rivets and other fasteners—cuts production time and costs—provides better heat conductivity—increases life of friction members—seals gaps and voids in metal products. It often facilitates the fabrication of complex shapes. And with modern adhesives, it permits more effective bonding of dissimilar materials.

Ray-BOND thermosetting adhesives offer excellent bonding qualities and heat stability. Compounds are based on synthetic or natural rubber, resin bases of all types, and combinations of rubbers and resins which provide good performance under the most severe operating condition. Ability to resist temperature extremes ranging from -80° to as high as 700°F makes these adhesives very desirable for high-temperature applications. And where necessary, special formulations of these products can be devised for your specific needs.

If bonding, laminating, sealing or coating can cut costs or improve production in your own operations, contact Raybestos-Manhattan. With over 20 years' pioneering in the production of bonded assemblies and the manufacture of adhesives and coatings, R/M has acquired a wealth of knowledge and experience that could help solve problems you may be facing now. Our engineers are ready to work closely with yours to make that solution prompt, practical and profitable for you.



Write now for your free copy of R/M Bulletin No. 650. It contains the engineering information you'll want to have on Ray-BOND Adhesives, Protective Coatings, Sealers.



THE TRADE-MARK THAT SPELLS PROGRESS  
IN FRICTION MATERIAL DEVELOPMENT

## RAYBESTOS-MANHATTAN, INC.

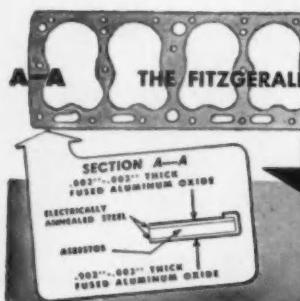
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**FITZGERALD**

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**GASKETS**  
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SINCE 1906

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Produced economically in our modern plant for:

AUTOMOTIVE, INDUSTRIAL EQUIPMENT, AIRCRAFT, AGRICULTURAL INDUSTRIES AND OTHERS; will boost your output at material savings.

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- INCREASED ACCURACY
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SPECIAL CUTTERS

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# 7 WAYS to SAVE MONEY with TOCCO\* Induction Hardening



**1** Cost was reduced 94% when heat-treatment of this corn harvester part was changed from carburizing to TOCCO-hardening. 9½c saved on every piece — \$4750 on each 50,000 piece batch, plus an hourly production increase from 120 to 300 pieces per hour.



**2** \$375 per day! When Salisbury Axle switched to TOCCO-hardening axle shafts. Less machining—30 seconds instead of 2 minutes—means lower tool cost. Also production zoomed from 50 to 120 per hour. TOCCO hardened shafts have 200% greater torsional life.



**3** Kearney & Trecker Corp. reduced the cost of hardening this milling machine part from \$1.57 to 10c apiece. In addition TOCCO made possible a switch from alloy to S.A.E. 1045 steel—saving another 11c per piece in material cost. Kearney & Trecker hardens 140 different parts on one TOCCO unit.



**4** Thompson Products Ltd. boosted production of these automotive wrist pins from 500 to 1200 per hour when they switched to TOCCO-hardening. Costs fell from \$5.45 to \$3.25 per hundred parts—a savings of 2c per pin, \$26.40 per production hour.



**5** Mechanics Universal Joint Division of Borg-Warner reports a 69% savings in the hardening of stub ends for propeller shafts. TOCCO also upped production from 35 to 112 parts per hour—over three times as fast as conventional heating methods.

Lima-Hamilton Corporation adopted TOCCO for hardening this shifting lever. Results: a savings of 4c per piece—\$25 per production hour. TOCCO costs only 17% of former heating method. This is only 1 of 139 parts TOCCO-hardened by Lima-Hamilton Corp. All show savings over usual heating methods.



**7** Number 7—the lucky number—is up to you. Why not add your name to the list of companies who use TOCCO Induction Heating to increase production, improve products and lower costs. TOCCO engineers are ready to survey your plant for similar cost-saving results—without obligation, of course.

THE OHIO CRANKSHAFT COMPANY



# TOCCO

\*Trade Mark Reg.  
U. S. Pat. Off.

NEW FREE  
BULLETIN

THE OHIO CRANKSHAFT CO.

Dept. H-9, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name \_\_\_\_\_

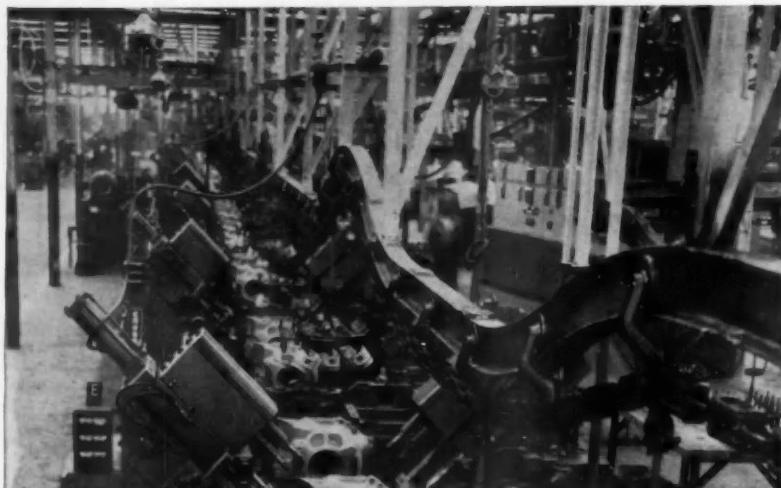
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# In the Spectacular PLYMOUTH ENGINE PLANT you see



(Above) View of Plymouth  
Engine assembly line



In the new Plymouth "Qualimatic" Engine plant you see Vickers Hydraulics on every side. Hundreds of machines in this latest and greatest example of automation are Vickers equipped.

Both builders and users of production equipment appreciate the significant advantages of Vickers Hydraulics . . . advantages that help produce better products at lower cost.

A specific need in the Engine Plant is standardization on a few basic hydraulic units to keep down parts inventories. The Vickers line makes standardization easy. Also desirable are hydraulics in units quickly demountable . . . so that by replacing units, repairs on the job are avoided and costly downtime reduced. Vickers has extensively developed demountable unit construction.

Whether automated or not, more and more plants have more and more Vickers Hydraulics. For further information, write for Catalog 5002B.

**VICKERS<sup>®</sup>**  
**HYDRAULICS**  
*Wherever  
You Look*

Plymouth Engine Plant is 980' long and 500' wide. Indicative of its scope is crankshaft machining requiring 4500 linear feet of automation composed of 385 individual units. Plant capacity is 150 engines per hour.

## VICKERS HYDRAULICS is used on machines supplied by these Companies to Plymouth Engine Plant

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Fitchburg Engineering Corp.	The Sheffield Corporation
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DIVISION OF SPERRY RAND CORPORATION  
ADMINISTRATIVE and ENGINEERING CENTER  
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For Tools and Parts  
Like These . . .



## Get the Facts Today . . .

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**Specials.** V-R produces custom made carbide blanks for flat and circular form tools and all special cutting tools and wear parts.

**Grades.** V-R standard grades of cemented carbides will fit most applications.

**Quality.** V-R advanced manufacturing and control procedures assure you of consistent uniformity of product.

ASK FOR CATALOG — complete dimensional and price data on hundreds of stock blanks and cutting tools. Call your local V-R Representative or Distributor . . . or write:



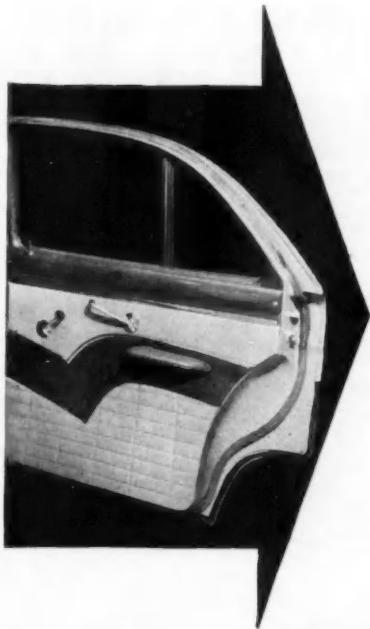
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SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

824 Market Street, Waukegan, Illinois

Since 1930  
Leader in the Manufacture  
of Quality-Controlled Carbides

C-588



# How a new kind of fabric opened the door to a new kind of car interior

Behind so many of today's colorful high-fashion car interiors: Lantuck non-woven fabrics.

As an improved backing for vinyl upholstery, Lantuck made possible the brilliant new interiors conceived by the industry's leading designers. Lantuck-NR (nylon-rayon) created specifically for automotive use, helped bring about many startling changes in upholstery textures and colors.

And it stands behind many more new ideas being readied for the years ahead, offering re-

duced production costs and improved product performance never possible before! For free copy of new book explaining the unique advantages of these non-woven fabrics, write Lantuck Dept. A9.

#### *Some of the unique advantages provided by Lantuck in properly coated vinyl upholstery*

- Balanced tensile strength, tear and stretch characteristics in all directions, because of random distribution of fibers.
- High tear strength, excellent stretch and recovery qualities.
- High gauge-weight ratio.
- Smooth surface, no show-through of weave pattern, excellent for embossing.
- Available in variety of natural and synthetic fibers and combinations.
- Wide range of widths, weights, gauges and densities.



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# AiResearch Turbochargers

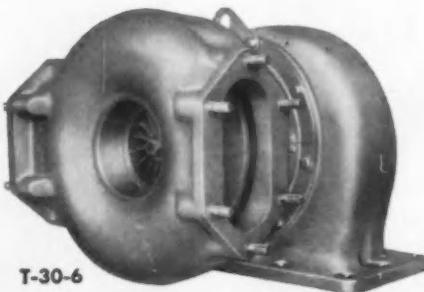
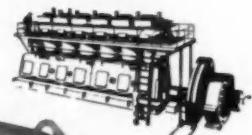


T-14

These  
scientifically-engineered  
turbochargers  
for your mobile,  
stationary or marine  
diesel engines  
are available  
now!



T-15



T-30-6



T-30-2

AiResearch has incorporated into the design and manufacture of its turbochargers the greatest experience in the field of small turbomachinery of any company in the world! With these results:

AiResearch turbochargers increase power up to 100%. The only limitation is the design and application of your engine.

Because they are air-cooled, they place no extra burden on your cooling system.

They cut fuel costs up to 20%, reduce noise and decrease or completely eliminate diesel smoking.

They're easier to maintain than any other turbochargers. A removable rotating assembly simplifies and reduces maintenance.

They allow your diesels to operate at full efficiency from sea level to more than 8000 feet.

We invite your inquiry on how you can improve the performance of your diesels by the application of AiResearch turbochargers.

#### BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS

MODEL	T-10	T-14	T-15	T-30-2	T-30-6
Diameter — in. nom.	9	11.5	15.25	15.25	16
Length — in.	9	14.12	16.75	17.25	21.75
Weight — lb.	40	95	125	135	195
Output — lb/min. (Standard Conditions)	25-40	35-65	35-65	70-95	115-175



**CORPORATION**

**AiResearch Industrial Division**

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

# For your protection when you want GRAPH-MO<sup>®</sup> tool steel remember...



THERE IS ONLY ONE GRAPH-MO TOOL STEEL and it is made *only* by the Timken Company. Graph-Mo is a registered trade-mark owned by The Timken Roller Bearing Company covering our own graphitic type oil-hardening alloy tool steel.



GRAPH-MO IS THE ORIGINAL OIL-HARDENING GRAPHITIC TOOL STEEL. Graph-Mo is a metallurgical development of The Timken Roller Bearing Company, who developed and promoted the graphitic type tool steels.



GRAPH-MO TOOL STEEL IS AVAILABLE ONLY through the authorized tool steel distributors of The Timken Roller Bearing Company.

MAKERS of quality dies, gages, punches and machine parts rely upon the Graph-Mo<sup>®</sup> trade-mark to insure the quality and economy needed for their parts. We're proud of that confidence. We prize Graph-Mo's reputation. The trade-mark Graph-Mo helps us protect this reputation. That trade-mark protects *you*, too. Here's why:

The trade-mark Graph-Mo identifies the most stable, machinable and wearable of all tool steels. By specifying Graph-Mo, the original graphitic tool steel, you can always be sure of these advantages and the high quality you've come to expect from

Timken fine alloy steels.

To be sure you get Graph-Mo, always specify it by name. And remember it is available only through authorized distributors of the Timken Company. For more information about it or our other specially developed graphitic tool steels, send for the new 10th edition of "Timken Graphitic Steel Data Book". Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". Tapered Roller Bearings, Alloy Steel and Seamless Tubing, Removable Rock Bits.

# TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

AUTOMOTIVE INDUSTRIES, September 1, 1956

255

# The Right Lathe for You from LeBlond's Complete Line...

## Regal Lathes



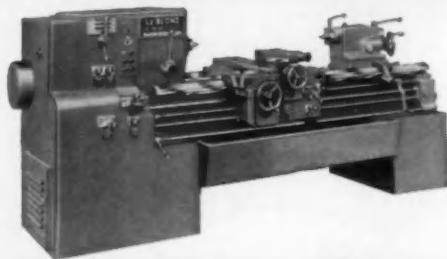
## Dependable Performance at Low Cost

13", 15", 17", 19", 21", 24"; 2 to 5 horsepower

Designed and built like heavy-duty lathes, the new LeBlond Regals will give you a long life of precision production, minimum maintenance and the kind of dependability you'd expect from a much higher-priced machine!

**Major features:** Hardened and ground replaceable steel bed ways. Combination gear-belt drive headstock. Both feed rod and leadscrew. 3-bearing spindle. Advanced styling. Plus general construction details patterned after LeBlond heavy-duty lathes.

## Small Heavy Duty Lathes



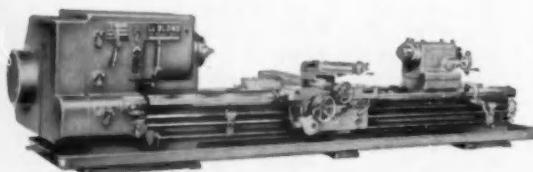
## Stamina Plus with Precision

12", 14", 16", 20"; 7½ to 20 horsepower

LeBlond heavy-duty engine lathes have always been known for their outstanding stamina—the ability to stand up to the toughest turning jobs with precision, year after year. Our new machines in this class are the most rugged, yet precise that we've ever built!

**Major features, 16" machine shown:** Single-lever, four-way power rapid traverse built into the one-piece apron. Combination gear-belt drive headstock with 27 speeds from 16 to 2000 rpm. Totally enclosed quick-change box. Hardened and ground replaceable steel bed ways. Automatic lubrication.

## Large Heavy Duty Lathes



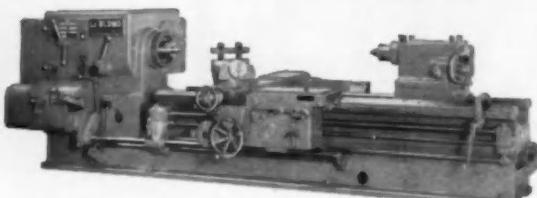
## Heavy Hogging or Fine Finishing with Ease

25", 32", 40", 50"; 50 and 60 horsepower

When large-swing work is in your production picture, check these big LeBlonds. Whether you need real high power, contoured shapes or fine finish, LeBlond offers the utmost in dependability, speed and easy operation.

**Major features, 32" machine shown:** Adjustable acceleration for starting, stopping, jogging provides true safety. 36-speed headstock, spur gear design for the lowest no-load friction horsepower. Four-way power rapid traverse (six-way on 40s or 50s). Generous proportions throughout for long-lived stamina and precision!

## Sliding Bed Gap Lathes



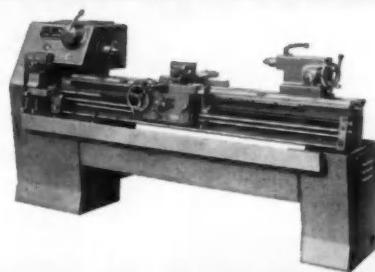
## Maximum Versatility with Dependability

16"/38", 25"/50", 32"/60" Heavy Duties; 17"/28" Regal

Lathe department all rolled up in one machine! In addition to regular turning, facing, chasing, tracing, you can handle odd-shaped or large-diameter work as well as extra-long pieces.

**Major features, 25"/50" machine shown:** Sliding upper bed moves easily to provide variable gap or capacity for extra length. 36-speed high-power headstock. Special one-piece apron with extended length handwheel brings cutting tool close to gap. Four-way power rapid traverse.

## Dual Drive Lathes



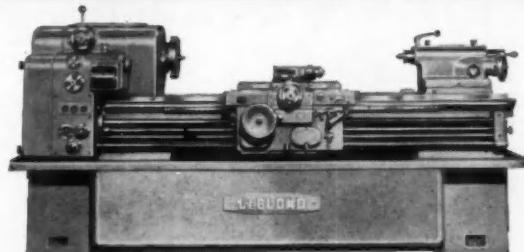
*Best Buy for Medium-duty Turning*

*15"; 5 horsepower*

Dual Drive gives you efficient capacity for the great proportion of your lathe work. Smooth and powerful spindle speeds satisfy all requirements up to those requiring a heavy-duty machine. Precision production at moderate cost!

**Major features:** Single-lever choice of 16 spindle speeds from 31 to 2400 rpm through combination gear-belt drive headstock. Hardened and ground replaceable steel bed ways. Totally-enclosed quick-change box. Automatic lubrication. Double-wall, one-piece apron.

## Model RT Toolroom Lathes



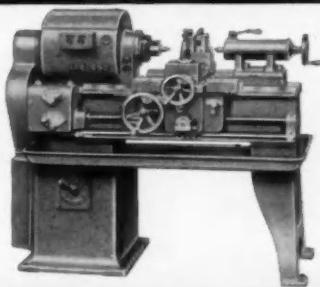
*The Ultimate in Precision, Convenience, Versatility*

*16"; 7½ horsepower*

Even today, other lathes can't match the advanced designs pioneered by LeBlond in the RT Toolroom Lathe. When it comes to producing a wide variety of fine toolroom work, no other lathe can match the convenience, precision and speed of the RT.

**Major features:** Infinitely-variable spindle speeds from 6 to 1500 rpm by a single lever. Universal quick-change box provides 90 feeds and threads. Four-way power rapid traverse. Combined feed apron cuts steep tapers. Automatic chasing stop limits cross slide travel, saves time in chasing threads.

## Rapid Production Lathes



*Best for Low-cost High Production*

*13", 17", 21"; 3 to 10 horsepower*

Not a stripped down engine lathe, RP is designed to give you high production for a variety of work within a range you choose. A great number of productive attachments are available to suit your special needs.

**Major features, 13" machine shown:** Choose from three headstocks that give you speeds as low as 68 rpm and as high as 3600 rpm. Hardened and ground replaceable steel bed ways. Automatic lubrication to headstock and feed box. Heavy-duty carriage and apron.

## LeBLOND also Builds:

**Plain Bed Gap Lathes.....** 12", 14", 16", 20", 25", 32"

**Hollow Spindle Lathes.....** 16", 20", 27", 30"

**Toolroom Lathes.....** 12", 14", 16", 20"

**Standard Duty Lathes.....** 20", 25", 32", 40"

**Crankshaft Lathes.....** Automatic—for any crank

**Cutter Grinder**

**Hydra-Trace\***

**Duplicating Attachment**...Fits most LeBlonds built since 1935

\*Trade Mark Reg. U. S. Pat. Off.

Write for complete catalog C-56N

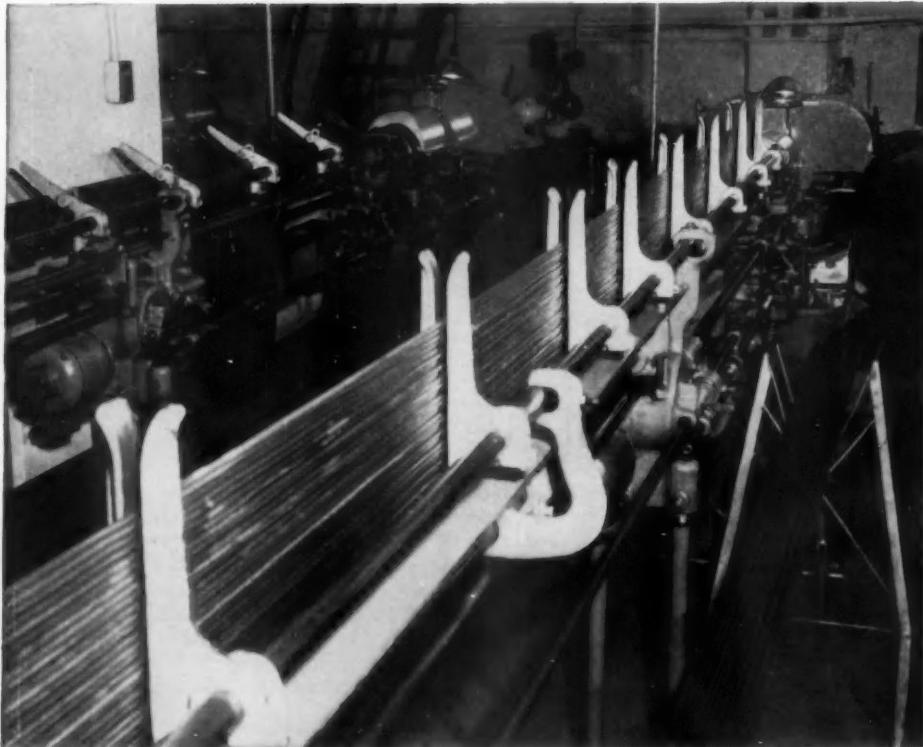
**The R. K. LeBlond Machine Tool Company** Cincinnati 8, Ohio

*World's largest builder of a complete line of lathes for more than 69 years*

*Representatives in principal cities throughout the world*



# How "MASTER" put a USS Amer-Led hikes



Feed end of the Brown and Sharp automatic screw machines. A couple of dozen Amer-Led rods can be stocked at one time.

Business end of the screw machines. Increased production was most noticeable here, where shackles are cut, formed and drilled.



Broaching is performed on this Zeh and Hahnenman toggle press. Tool life is much greater since use of Amer-Led.



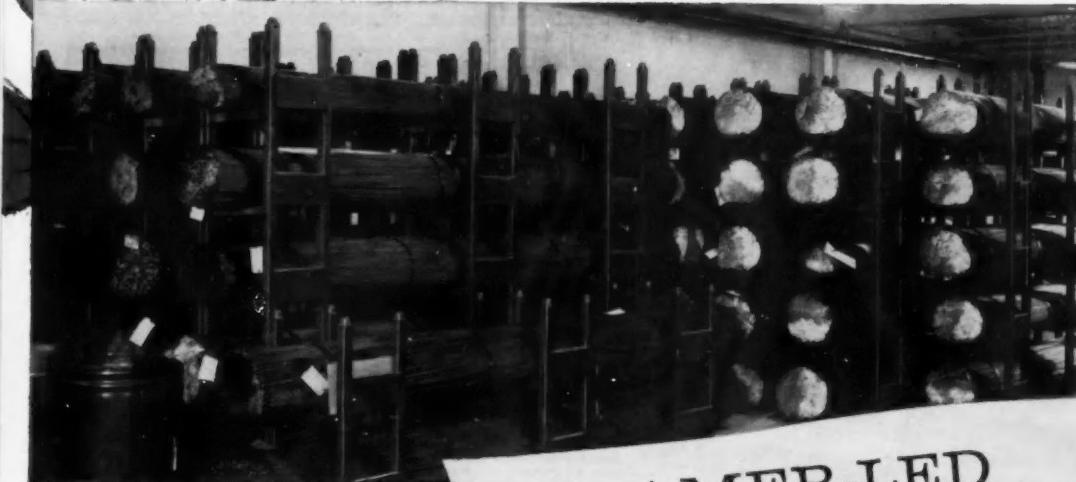
# padlock on costs... production 25% to 75%

When American Steel & Wire first developed Amer-Led free machining stock, it was suggested to Master Lock and it worked like a charm. Automatic screw machine production leaped 25% to 75% without any increase in tool wear! The finer grain structure of this new steel permitted more accurate cutting to closer tolerances, and there were fewer rejects, too.

Punch press production increased 15% to 20%, and was limited only by the ability of the operator to feed the machine. Although production was not increased in the broaching operation, tool life was increased.

Of course, this is the story of Master Lock Company. If you yearn for results like this, then get in touch with your AS&W representative. Ask about USS Amer-Led.

◀ Schoolboys can identify a "Master" padlock with its unusual laminated steel case. The shackle is possibly the most important part. Miscreants try to twist it off with a crowbar, or sever it with hacksaw or rasp. Obviously, the shackle must be hard and free from brittleness after heat treatment; and during production it must be ductile and machinable.



The Amer-Led is stored as received—in steel strapped bundles. There's a type for most machining operations.

AMER-LED  
SUPER-MACHINING  
BARS



AMERICAN STEEL & WIRE

DIVISION, UNITED STATES STEEL

GENERAL OFFICES: CLEVELAND, OHIO

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

## Here's NEW Speed and Economy in HOLE SIZING and FINISHING!

**BALLIZING** is a high-speed, high-precision process for sizing and finishing holes — simply by pressing a suitably-oversize ball through the unfinished hole. It is used to advantage with holes from  $1/16"$  to  $5"$  diameter, in a wide range of metals—with production quantities from 1 piece to millions.



Rod (not shown) pushes ball through unfinished hole.  
Precision ball of tungsten carbide, slightly larger than finished hole.

Hole before ballizing.

### ADVANTAGES:

- FAST. Takes only seconds. Well suited to automation.
- ACCURATE. Produces uniform hole size.
- FINE FINISH — burnished smooth.
- ECONOMICAL. Replaces one or more machining, grinding or finishing operations. Uses unskilled labor. No tool sharpening. No close adjustments. No special or high-precision equipment required.

**FREE BALLIZING BULLETIN** gives details; shows typical applications. May we send you a copy?

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3692 Jackson Rd., Ann Arbor, Michigan  
5003 E. Washington Blvd., Los Angeles 22

PRECISION BALLS OF ANY SIZE OR MATERIAL  
ANTI-FRICTION BEARINGS FOR SPECIAL REQUIREMENTS

TOOLING BALLS — MASTER BALLS — SPHERICAL FINISHING



**BABY FORK LIFTS  
TO EARTH-MOVING GIANTS**

**Use TUTHILL SPRINGS**  
*designed for the job!*

FINEST ALLOY  
STEEL LEAF AND  
HELPER SPRINGS

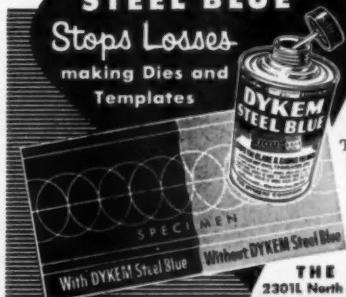
Solving unusual spring and load problems is a 74-year-old success story at TUTHILL. Since 1880, we've been designing and making dependable, alloy-steel, springs for cars, trucks, fire-fighters, trailers, multiple-axle jobs, dump trucks, jeeps. Whatever your need, call upon TUTHILL's top caliber skills and materials to provide the right springs — built for your job.

**TUTHILL SPRING CO.**

760 West Polk Street Chicago 7, Illinois

## DYKEM STEEL BLUE®

Stops Losses  
making Dies and  
Templates



Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief. Prevents metal glare. Increases efficiency and accuracy.

Write for sample  
on company letterhead

**THE DYKEM COMPANY**  
2301L North 11th St. • St. Louis 6, Mo.

## CUT SCRAPER TIME

END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin; trims clearly. No grit; nonirritating to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

**THE DYKEM CO., 2301L NORTH 11TH ST., ST. LOUIS 6, MO.**

### New RAILS Relaying



ALSO IN STOCK  
TIE PLATES  
SHEETS & PLATES  
STRUCTURAL  
AND ALUMINUM PRODUCTS

TRACKWORK of ALL KINDS

LIGHT RAILS—12# TO 40#—20'0" & 30'0"  
HEAVY RAILS—40# TO 100#—30'0" & 33'0"  
JOINT BARS, BOLTS, TIE PLATES, SPIKES &  
TOOLS, FROGS, SWITCHES, STANDARD &  
SPECIAL TRACKWORK.

SEND US YOUR INQUIRIES

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OVERSPEED GOVERNORS**  
AIRCRAFT AND INDUSTRIAL TYPES  
**Synchro-Start Products, Inc.**  
8151 N. RIDGEWAY AVE. • SKOKIE, ILL.

Quality surface treatments  
for metals

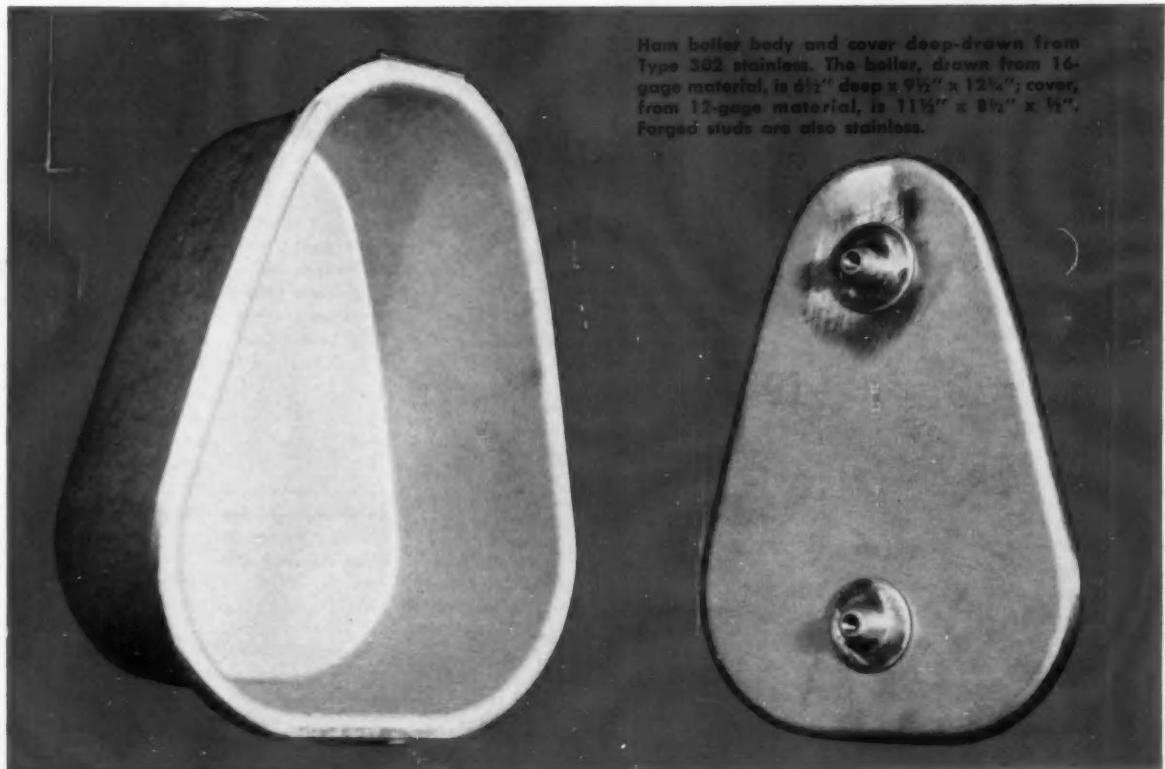
## PARKER RUST PROOF COMPANY

DETROIT, MICHIGAN

**A**UTOMOTIVE INDUSTRIES is read by general executives, production men, engineers, purchasing agents and others whose o.k. means orders for those who sell to The World's Largest Manufacturing Industry.

### Classified Advertisement

150 H.P. TYPE TLC-50 G.E. DYNAMOMETER 2200-4000 R.P.M. COMPLETE WITH SCALES, CONTROL PANEL, GRIDS, TACH AND CONVERTER, CAN BE SEEN IN OPERATION 8:30 TO 5:00. EXCELLENT CONDITION, REASONABLY PRICED. HOOF PRODUCTS COMPANY, 6543 S. LARAMIE, CHICAGO 38, ILLINOIS. PORTSMOUTH 7-6330.



Ham boiler body and cover deep-drawn from Type 302 stainless. The boiler, drawn from 16-gage material, is  $6\frac{1}{2}$ " deep  $\times 9\frac{1}{2}$ "  $\times 12\frac{1}{4}$ "; cover, from 12-gage material, is  $11\frac{1}{2}$ "  $\times 8\frac{1}{2}$ "  $\times \frac{1}{4}$ ". Forged studs are also stainless.

## Pictured as is...to show you how T & W TECHNIQUE SAVES



Forging, weighing .284 lb., of 302 stainless steel, for stud shown above.



The illustration above shows a stainless steel ham boiler, consisting of two deep-drawn parts, plus two forged studs on the cover, all of which we make and assemble. This picture is unretouched. We left it *as is* because it tells so plainly how our technique produces a smooth, nearly-finished job, minimizing subsequent polishing operations. This saves the customer money.

This is just one part of **T & W Technique**, which also includes help for you in initial design, as well as scheduling our production and shipping precisely to your needs, so you obtain a product that usually costs you less at your point of final assembly. Send the coupon or your prints for estimating to learn more about how we can help you.

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**T & W TRANSUE & WILLIAMS**  
**FORGINGS**

Over 50 years of experience

*Sales Offices:*

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**T & W DEEP DRAWN STAMPINGS AND FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY**

**TO: Transue and Williams, Alliance, Ohio**

Please let me know what "T & W Technique" can do for us. We are interested in

**Forgings**     **Stampings**

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Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

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## Multiform BIG BROTHER BENDER

Model BBB



Illustrated above are a few of the many forms that can be produced efficiently on the Multiform Bender.

### AIR OPERATED MODELS IN FOUR SIZES

The heavy duty Big Brother Bender is designed for fabricating bus bars, brackets, fixtures, etc., without special tooling. Air controlled with finger tip response. Comes complete with dies, mandrels and wrenches — punching and blanking dies extra. Will punch holes up to 1" and form material up to  $\frac{1}{4}$ " thick by 4" wide. We also build smaller models, hand or air operated, for bending materials up to  $\frac{1}{8}$ " x  $1\frac{1}{2}$ ".

Send for illustrated folder AMI-2

**J. A. RICHARDS CO.**

903 North Pitcher St.  
Kalamazoo, Mich.



### ENGINE COOLING RADIATORS

#### • HEATERS

#### • OIL COOLERS

**THE G & O MANUFACTURING CO.  
NEW HAVEN CONNECTICUT**

# NEW LONG LIFE PISTON



**PUTS  
CAST IRON WEAR  
IN TOP RING GROOVE**

G and E Wire Insert Piston before machining (left) and after ring grooves are cut (right) showing how the steel wire forms a tough wear-resistant surface on both faces of top ring groove. The ferrous top ring molded in the head plug of diesel pistons prevents burning through head and lengthens diesel piston life!

## G and E WIRE INSERT PISTONS

- ★ Low initial cost
- ★ Light weight
- ★ Amazing increase in piston life
- ★ Maintains new engine power and performance

This Gillett & Eaton exclusive steel wire insert is cast right into the alloy piston to make hard surfaces for the top ring groove. Here's an entirely new piston design combining all the advantages of aluminum alloy with the long life of steel wire bearing surfaces in the top ring groove. No noticeable increase in weight. G and E Wire Insert Pistons are real top performers at Low Cost—barely more than ordinary alloy pistons!

When the grooves are machined, the closely spaced steel wire inserts cast in the piston become hard bearing surfaces on top and bottom faces of the groove. The wire insert also strengthens the second ringland.

Engines fitted with Gillett & Eaton Wire Insert Pistons maintain new engine power and performance much longer because top ring groove wear is greatly reduced. Build extra volume and profits at Low Cost with Gillett & Eaton Wire Insert Pistons.

GET THE G AND E WIRE INSERT STORY—Send your specifications and requirements—let us quote you.

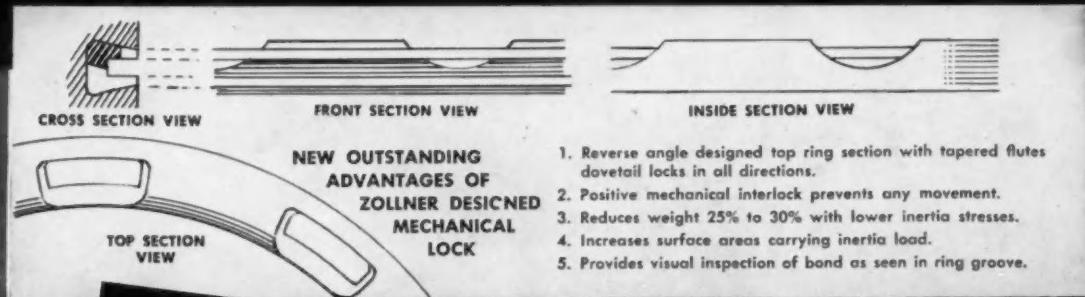
**GILLETT AND EATON, INC. 841 DOUGHTY STREET • LAKE CITY, MINN.**



ESTABLISHED 1868

# BOND-E-LOC\* PISTONS

WITH "NI-RESIST" IRON TOP RING SECTION



NEW OUTSTANDING  
ADVANTAGES OF  
ZOLLNER DESIGNED  
MECHANICAL  
LOCK

1. Reverse angle designed top ring section with tapered flutes dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.
5. Provides visual inspection of bond as seen in ring groove.

*Double Bonded*  
METALLURGICALLY  
Al-Fin Bond  
MECHANICALLY  
Zollner Lock

## STOPS!

### RING GROOVE WEAR IN HEAVY DUTY SERVICE

"Sensational mileage" is the unanimous report of heavy duty engine builders and transport operators using Zollner "Bond-O-Loc" Pistons. Another great development by Zollner engineers, this super-mileage piston has a "Ni-resist" top ring groove section permanently incorporated with the *double bond* of both Al-Fin metallurgical and the exclusive Zollner mechanical lock. Separation failure is impossible. Ring groove wear problems are eliminated, blow-by prevented, oil consumption minimized, mileage to overhauls greatly increased. We suggest an immediate test of these sensational advantages for your engine.



Licensed under Patents  
2,396,730; 2,455,457;  
2,550,879  
\*T. M. Reg. Pat. App. For

ZOLLNER

ADVANCED  
ENGINEERING  
PRECISION  
PRODUCTION  
COOPERATION  
with Engine  
Builders

PISTONS

THE ORIGINAL EQUIPMENT PISTONS

# ZOLLNER

ZOLLNER • Fort Wayne, Indiana

# FACTS

about

**NEW DEPARTURE**  
BALL BEARINGS



Split Inner Ring  
Main Shaft Ball  
Bearing



Accessory Ball  
Bearings

## FOR AIRCRAFT TURBINES

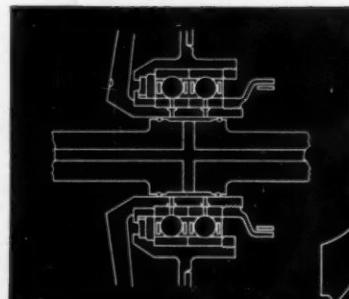
High speeds, high temperatures and heavy loads . . . both radial and thrust . . . characterize bearing applications for turbines used in present ultra-fast aircraft.

New Departure's Aircraft Bearing Research Program has produced ball bearings for highly satisfactory operation in small, medium and large turbines and their accessories.

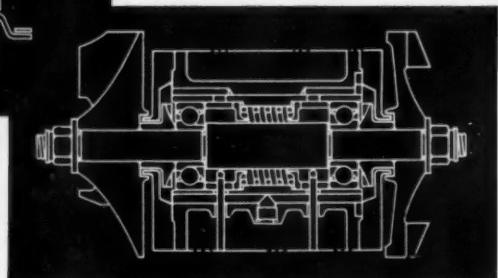
Under this program, ball bearings of different steels dimensionally stabilized for high-temperature operation have been developed and produced. Needs for bearings with high-thrust capacity and varied lubricating methods have been met. And, bearings with various geometrical specialities to satisfy difficult mounting and operational requirements were designed.

Beyond this, New Departure is working on bearing developments for the more powerful, faster aircraft of tomorrow.

**For further details, send for Folder TB, on turbine bearings.**



LEFT: Split Inner Ring Bearings  
on Turbine Main Shaft



RIGHT: Typical Installation  
of Ball Bearings in a  
Refrigeration Turbine